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Proposal for Consulting Services

DESIGN OF J LINE EXTENSION

San Francisco Municipal Railway
Transit Improvement Program

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Submitted by:

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PBQ&D, Inc. Engineers • Architects • Planners

June 22, 1979

Mr. Rino Bei
Program Manager
Transit Improvement Program
San Francisco Municipal Railway
949 Presidio Avenue, No. 150
San Francisco, CA. 94115

Dear Mr. Bei:

Parsons Brinckerhoff is pleased to submit this proposal for the Municipal Railway's "J" Line Extension to the Balboa Park BART Station for the San Francisco Municipal Railway Transit Improvement Program. We have assembled a team of consultants to perform the required work in a timely and effective manner.

We are proposing Mr. K. K. See-Tho as Principal-in-Charge and Mr. George Stanske as Project Manager for this Muni Transit Improvement Project. Mr. See-Tho has had more than 15 years of transit experience in the San Francisco area on various BART and MUNI engineering projects. Mr. See-Tho is Assistant Vice President and Office Manager of the San Francisco Office. Mr. George Stanske our proposed project manager, is the resident railway transit specialist in the San Francisco Office with more than 25 years of related experience.

In assembling this team, Parsons Brinckerhoff has sought to provide the best available expertise and to fully conform to San Francisco's Human Rights Commission mandates for minority participation. This proposal has been prepared in accordance with the terms set forth in your RFP and with an understanding of the special problems and conditions determined by familiarity with the project site, and as a result of considering the preliminary plans prepared for this project. Our knowledge of the MUNI light rail system and equipment, and our experience with LRV systems in San Francisco and throughout the U.S. provides MUNI with a fully qualified consultant team. This proposal takes special consideration of the City, State and Federal environmental impact report and statement requirements.

165 Post Street • San Francisco, California 94108 • 415-986-2929 • Cable: Parklap, San Francisco • Telex WU3-4763

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Mr. Rino Bei
Program Manager
Transit Improvement Program
San Francisco Municipal Railway

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Associated consultants for this project include Jack Woods of TSMC for traction power and L. T. Klauder advisors for traction power; DD & A for surveying; J. Warren & Associates for utilities, Charles M. Salter & Associates for noise evaluation, Environmental Impact Planning Corporation and E. M. Rose & Associates for environmental impact statement/report preparation.

In Phase I our anticipated minority participation amounts to 47% of the proposed work. Small business and minority business participation totals 50% of the work for Phase I.

We believe that the experience and qualifications of Parsons Brinckerhoff staff personnel and its associated consultants in the planning and design of rail lines and extensions is second to none. The firm's experience in the planning and design of BART, the MUNI LRV system, the MARTA transit system in Atlanta, the Pittsburgh LRV design and currently the trackwork planning and design for the Buffalo LRV system make us uniquely qualified for this assignment. If you have any questions, please call me at 986-2929.

Very truly yours,

P B Q & D, INC.

Ray Holdsworth

Raymond W. Holdsworth
Vice President

RWH/smd
Enclosure

DESIGN OF J LINE EXTENSION

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PARSONS BRINCKERHOFF QUALIFICATIONS

Parsons Brinckerhoff is the oldest continuing engineering firm in the United States with a current staff of over 800 employees. The firm has a wide range of capabilities represented by its current staff, including transportation planning and engineering; civil and structural design; architectural planning and design; mechanical and electrical engineering; and urban and environmental planning and design. The firm's reputation was founded on rapid transit projects and over the years, Parsons Brinckerhoff has established a tradition of involvement in rapid transit systems. In 1906, the reputation of the firm was further enhanced by a new member: Henry M. Brinckerhoff, the co-inventor of the third rail system and one of the leading electric railroad and traction engineers of his day. An innovative transportation expert, Mr. Brinckerhoff helped develop rapid transit systems in Boston, San Francisco, Washington, D.C., and Chicago. Over the last two decades, Parsons Brinckerhoff has been almost continuously engaged in the study, planning and design of urban and regional transit systems and in the development of environmental impact studies to assist both the short- and long-range traffic balance and the coordination of mass transit with other transportation modes. Parsons Brinckerhoff has conducted numerous studies in the varied areas of transportation system planning, analysis, and design. Such studies have included responsibility for the generation of transportation system alternatives; detailed assessments of alternative system feasibility, performance impact, and implementation potential; and actual system design for transportation systems -- from mini-buses and para-transit to light rail transit and rail systems. The performing of studies in these areas has led to PBQ&D's becoming responsible for successful transportation system planning and development in many of America's cities.

Parsons Brinckerhoff has or is currently working on all but one of the light rail transit systems that are operating or under design/construction. These are Boston, Buffalo, Cleveland (Shaker Heights), Newark, Pittsburgh, Fort Worth, San Francisco, and have just been selected for the trackwork for the Light Rail System for the Niagara Frontier Transportation Authority. In addition, PBQ&D staff members have provided advisory assistance to the Philadelphia System. Parsons Brinckerhoff assisted in the development of the preliminary specifications for the U. S. Standard Light Rail Vehicle, and was selected as the General Engineering Systems Contractor to implement a light rail transit system in Denver.

Parsons Brinckerhoff has acquired more broad-based light rail transit engineering experience for implementing systems than any other engineering firm in the U. S. today.

As a confirmation of the leading and respected role which the firm has in developing and implementing public participation schemes in transportation planning, Parsons Brinckerhoff has been asked by the U. S. Department of Transportation to develop a handbook exploring effective means of utilizing citizen participation in all modes of transportation planning. The handbook

will be used as a manual on citizen participation by all 50 State Transportation Agencies.

As Prime Consultant in the development of the Atlanta Rapid Transit System, Parsons Brinckerhoff has demonstrated an ability to secure federal funding for this program and perform within budget and scheduling constraints. Robert Patricelli, UMTA Administrator at the time, announced additional UMTA funding for Atlanta and commended Atlanta for making a:

> "great record for itself by keeping on schedule and within budget" and emphasized his agency's commitment to reward MARTA's "high level of performance....UMTA has already committed $430 million to construction of the new rail system in Atlanta," Patricelli noted.

The extensive record of accomplishments, ranging from local transit improvement studies, to regional transportation alternative analyses, to interregional corridor studies, to major preliminary engineering and final transportation system design assignments provides particular qualification for Parsons Brinckerhoff for the design of the J Line Extension Project. Together with our associated firms, PBQ&D has assembled a team experienced and capable of successfully conducting all facets of the program. Listed below is a summary of our recent relevant experience in transportation planning and design.

- Light Rail Transit System, Pittsburgh: Parsons Brinckerhoff has been selected as the lead firm to develop a new light rail transit system for Pittsburgh. As part of the engineering efforts we will develop a north south corridor of about 10 miles. In addition, studies will be conducted to determine the feasibility of at-grade and subway alignments for a downtown distributor loop. Other activities include a value capture analysis (an evaluation which determines if development costs can be offset by income from a possible increase in land values within the vicinity of transit station) and engineering design in support of development of a 90 percent exact cost estimate. All of these activities are scheduled for completion within seven months of project initiation.

The Stage 1 environmental work program involves carrying out a comprehensive study of the environmental impacts of the project Impacts on the physical environment, such as air, water, geology, soils, and erosion, will be examined. Effects on the natural environment (flora, fauna, parks, and recreational areas) are also to be considered as well as the impacts of the Stage 1 - LRT system on community resources. Included here are such factors as land use relocation, transit-related development and growth, visual quality, and historical landmarks.

- Cleveland RTA Rail Reconstruction, Cleveland, Ohio: The joint venture of Parsons Brinckerhoff/Gibbs & Hill has been selected by the Greater Cleveland Regional Transit Authority to undertake Project 6 of the Cleveland RTA Rail Reconstruction Program: reconstruction of the Shaker Heights Light Rail Line.

The Shaker Heights Line, which will be completely rebuilt under an UMTA grant, consists of approximately 21 track-miles, operating partly on a grade-separated right-of-way, and partly at-grade in the medians of two boulevards. It was built between 40 to 60 years ago, and has deteriorated to the point where total replacement is required. The tasks are track replacement, replacement of overhead traction power, and improvement of power-conversion facilities, and will involve roadbed, track and tie, drainage, electrification and signalling design.

Parsons Brinckerhoff will have overall responsibility for project management, for the railway portion of the project, including structures, track, roadway work and drainage, and signalization and electrification.

- Tri-Met Light Rail Transit Engineering Portland, Oregon: The Tri-County Metropolitan Transportation District of Oregon (Tri-Met) has selected Parsons Brinckerhoff as lead in a joint venture for the preliminary engineering design of the Banfield Transitway Project. The Banfield Transitway Project is an on-going program which evaluates five alternatives, including Light Rail Transit (LRT), which will connect downtown Portland, Oregon, with large trip-generating suburban areas to the east. If LRT is selected as a result of preliminary engineering designs, estimates and evaluating, the Banfield corridor may become the first newly introduced Light Rail system to service a major transportation corridor within a U.S. metropolitan area in over fifty years. As such the Project has national significance.

Parsons Brinckerhoff and its associated team members will offer a complete spectrum of professional services including project management; management planning; supporting activities related to environmental evaluations and public participation programs; system engineering; engineering design of route, station zones and ancillary facilities; and report preparation. Much effort will be directed towards the various unique aspects of the Project and its location.

Included in the development of the Banfield Transitway Project will be the evaluation of full system accessibility by the elderly and handicapped, overall LRT/bus connectivity, system operations, traffic impact, and co-utilization of corridor sections by both private rail operations and Interstate Highway facilities. The project will be conducted in two phases: Phase I developing such information as necessary to identify LRT as a viable, cost-effective solution as compared to all bus and no-build alternatives, and Phases II to develop designs to that degree of detail necessary to secure approval and funding of final design and implementation.

- Niagara Frontier Transportation Authority, Buffalo, New York: Parsons Brinckerhoff has been selected to complete the final design of the trackwork for the new LRT Metro system, to be built by Niagara Frontier Transportation Authority, Buffalo, New York. Parsons Brinckerhoff is responsible for overall project management and supervision, all track work design services preparation of specifications and project cost estimating. Specific work tasks to be performed by Parsons Brinckerhoff for this new light rail project include: the design of floating slabs, the design of track support pads, material procurements, trackwork design, preparation of an operation and maintenance manual, preparation of quantity take-off for procurement contracts for engineer's cost estimate and prepare detailed construction cost estimates. Construction management services are to be provided as necessary.

The Buffalo Metro System (originally scheduled by the client as a 16-month effort) is planned for a 12-month design phase schedule by Parsons Brinckerhoff. Careful monitoring of materials procurement and costs required for construction will be carried out by the firm.

- Denver Light Rail Transit Systems, Colorado: Denver's Regional Transportation District (RTD) selected Parsons Brinckerhoff as general engineering and support contractor for design of the first segment of the RTD's proposed light rail rapid transit system. Because UMTA decided not to fund this project immediately (a decision based on work done by others), only a portion of the contract was performed. Three major tasks were completed during the seven months duration of our contract:

  - A reliability analysis of two leading light rail vehicles, one manufactured in the United States, the other in Germany.

  - The drafting of a comprehensive program for a total systems engineering approach to the design and implementation of the system.

  - A detailed workflow diagram and schedule for design, construction, testing, and startup services for the first segment system.

Through its participation in this project, Parsons Brinckerhoff developed a clear understanding of the problems inherent in the design of a light rail vehicle system, including vehicle specification and selection, reliability analysis and verification, and the complete array of trackwork, structures, electrification, communications, and control required for such a system.

- Newark Light Rail Feasibility Study, Newark: Parsons Brinckerhoff has assisted the City of Newark with a feasibility study of light rail transit improvements. A major portion of the study involved an analysis of potentials and methods of upgrading adjacent neighborhoods jointly with the transit effort.

Transit systems considered were light rail in tunnel, new technology cars on aerial structure, and at-grade light rail vehicles or buses. The system selected involved light rail vehicles in tunnel, primarily because it provided the greatest economic, social, and environmental benefits. In formulation the redevelopment proposals, the recommendation was made to avoid massive clearance and reconstruction projects, relying instead on rehabilitation and spot demolition to retain the existing medium-density nature of the corridor. Emphasis was also placed on increased job generating land use.

- San Francisco Light Rail Transit, California: Parsons Brinckerhoff has conducted many planning studies and design work in connection with the light rail vehicles in San Francisco. These have included electrification of the entire light rail system for the new vehicles; relocating the track on Market Street for the light rail system; engineering 5 stations for the new vehicles, and designing many miles of track for the Outer Mission light rail lines. Our design work for the Muni gave Parsons Brinckerhoff a working knowledge of design and construction methods in both a downtown environment, Market Street, and the suburban setting of the Outer Market Line involving mixed traffic and exclusive rights-of-way.

In addition, our assignment in the electrification of downtown San Francisco gave us a first hand experience in the problems of stringing wire in a congested downtown.

- UMTA Standard Light Rail Vehicle: Another relevent project undertaken by Parsons Brinckerhoff was the development of the specifications for the U. S. Standard Light Rail Vehicle. Under a grant from the Urban Mass Transportation, Parsons Brinckerhoff under the PBTB joint venture, joined with the Massachusetts Bay Transportation Authority (MBTA) in a program to develop a nationally applicable specification for Standard Light Rail Vehicles (SLRVs). It was intended that the specification, with only minor variations, would be aplicable to all systems, embody the latest available technology, and keep costs down. Tasks for this project included: assistance to the MBTA in determining criteria; review of draft specifications for completeness and applicability, with recommendations for additions and changes; preparation of design drawings and performance of miscellaneous design analysis; and assistance in the preparation and production of the final report. Upon completion of the specification, SLRVs were ordered by the San Francisco Muni System, and 150, slightly different in design, were ordered by Boston's MBTA. The SLRV's are 73 feet long, feature air suspension, and have an articulated joint in the center to permit negotiation of tight curves.

- Metropolitan Atlanta Rapid Transit Authority (MARTA): In 1962, Parsons Brinckerhoff Quade & Douglas began initial studies of a transit system for the metropolitan region of Atlanta, Georgia; in 1966, an expanded study program was instituted, under the joint venture of Parsons Brinckerhoff-Tudor-Bechtel (PBTB) with Parsons Brinckerhoff as managing firm. In 1971, the citizens of Fulton and Dekalb Counties, which include the City of Atlanta and make up the central part of the Atlanta metropolitan region, approved the resulting transportation plan; and in 1972, the PBTB joint venture was named general engineering consultant for the design and construction phases of the transportation program. The client is MARTA and the MARTA system encompasses a 54-mile rail transit component, including 39 stations, and an eight-mile busway component, including two stations. These constitute the long-range system. Design of these facilities commenced in 1973, following federal acceptance of the environmental impact statement, prepared under the direction of Parsons Brinckerhoff.

Parsons Brinckerhoff managed the preparation of the Environmental Impact Statement for Metropolitan Atlanta Rapid Transit Authority (MARTA). Study activities involved evaluation of environmental impact (including use of computer simulations to predict air qualities associated with alternative transportation strategies) and preparation of environmental impact statements; development of design criteria and standards applicable to the civil, structural, architectural, landscaping, electrical, mechanical, and equipment features of the rapid transit system; and detailed scheduling of design and construction of the regional rapid transit system including a review and refinement of design segments and construction contracts. In addition, the firm supervised a wide variety of community participation programs. Both the community and federal government fully approved the project and the official Environmental Impact Statement.

- San Francisco Bay Area Rapid Transit, San Francisco, California: As part of the joint venture organization, Parsons Brinckerhoff-Tudor-Bechtel (PBTB) with Bechtel as managing partner and led firm, Parsons Brinckerhoff provided extensive civil and structural engineering services for the joint venture. The Parsons Brinckerhoff contribution to the BART system was:

  Market Street Line - PBQ&D developed the alignment for the entire Market Street Line, as well as the basic concepts for station and cut-and-cover line construction. The Embarcadero, Powell Street Station and Hallidie Plaza and Montgomery Street Station for the BART and Muni.

  Muni Systems - The Church Street and Castro Street Muni Stations, and the Muni tunnels between Van Ness Avenue Station and Twin Peaks.

  Downtown Oakland - The 12th and 19th Street Station, the Broadway Tunnel, and the 9th Street Tunnel and turnouts.

  Outer Mission Line - The Balboa Park Station and the Daly City Station, and double trackage from Colonial Way to Daly City.

Trans-Bay Tube - at 3.6 miles it is the longest sunken tube tunnel in the world; at 135 feet, it is the deepest. The Oakland "Y" and the Ferry Building Plaza Platform and ventilation building.

Developed the civil and structural design criteria for the entire system.

The responsibilities for the systems engineering functions; vehicle, train control, fare collection, communications and traction power were assigned to other members of the Joint Venture.

- Long Island Railroad East Midtown Terminal Studies: The report on the feasibility of using Grand Central Terminal (GCT) as a location for the long Island Rail Road in East Midtown Manhattan was recently completed for the Metropolitan Transportation Authority. The report contains an analysis and evaluation of alternative designs considered for the LIRR Terminal at Grand Central and describes the tunnel connection for the LIRR Terminal and evaluated the impact on present and future operations of ConRail and Amtrak resulting from the introduction of LIRR service to GCT. Also studied was the feasibility of using GCT as a joint terminal for ConRail, Amtrak, and LIRR, and the effects on passenger flow within GCT and on existing stations at the terminal. The report also contained evluations of the structural changes needed to accommodate the LIRR terminal at GCT, and went on to describe construction methods and list construction costs.

- Massachusetts Bay Transportation Authority (MTBA), Boston, Massachusetts: Parsons Brinckerhoff is presently designing a 3.2 mile extension of the MBTA's Red Line from Quincy Center to South Braintree. This project includes a station and a 1000 car parking garage at South Braintree. Parsons Brinckerhoff had previously done a Preliminary Design Report on this extension and prepared an Environmental Impact statement concerning a proposed station at South Quincy in this segment. In addition, for the Massachusetts Department of Public Works, the firm is preparing plans and specifications for an interchange and ramps from Route I-93 into the South Quincy station area.

Parsons Brinckerhoff was also responsible for the design of the Cabot Maintenance Center Facility. This facility is for the maintenance and repair of the modern vehicles of the Red Line system and had a construction cost of $34,000,000.

- Caracas Metro, Caracas, Venezuela: Another system that has involved Parsons Brinckerhoff - and one for which we are still providing services - is the Caracas Metro. Parsons Brinckerhoff in joint venture is developing a far-reaching program to provide Caracas and its metropolitan area with a modern transit system and a fully integrated transportation plan. The firm has been given sole responsibility for two major elements, the ventilation studies and conceptual designs. The Caracas Metro will be built in stages to follow priorities established through studies. The more essential segments and lines will be in operation as a functional part of the final system as soon as feasible. The design of the first and middle third sections of the system has been assigned to the Parsons Brinckerhoff team.

- Sao Paulo Metro, Sao Paulo, Brazil: For the final design of a complex subway portion of the Metro, a rail transit system for Sao Paulo, Brazil, Parsons Brinckerhoff furnished a team of engineers to provide technical assistance to the Brazilian firm, Promon Engenharia, S.A. The firm had a contract for the design of a one sector of the Metro.

- Washington Metropolitan Area Transit Authority (WMATA), Washington, D.C.: For the Washington Metropolitan Area Transit Authority, Parsons Brinckerhoff has been responsible for the design of two sections of the new Washington, D.C. subway system, the METRO. Facilities designed included four subway tunnels, the Waterfront Station, ventilation structures, an electrical substation, and drainage pumping stations. Services provided by the firm included preparation of final contract plans and specifications, and provision of cost estimates and other construction contract documents.

- Pitkin County Transportation Study, Colorado: Parsons Brinckerhoff was retained by Pitkin County (Aspen), Colorado, as part of a consultant team to do a comprehensive analysis of transportation alternatives for the recreational complex centered in the Aspen/Snowmass region of the Rocky Mountains. We were responsible for the evaluation of various transport modes which might be utilized in Pitkin County. Many systems were analyzed, including a light rail system conceptually similar to busway-concept, but utilizing rail technology to replace buses for the line haul segments of travel. These systems were examined and described in terms of the technology employed, operating characteristics, service provided, system requirements, route maps, illustrations, advantages, and disadvantages. These systems were then evaluated with respect to a number of separate criteria for the target year of 1990. The analysis was specifically designed to measure the long range potential of each alternative to alleviate the recreation-related transportation problems in the Roaring Fork Valley, which are expected to occur as a function of anticipated 1990 land use, activity, and travel patterns in the Valley. Various combinations of land use/development futures and pedestrian treatments, auto-free zones, parking management strategies, auto disincentives, and transit system developments were reviewed in combination with the following evaluation criteria: transit system patronage, transit system performance characteristics, transit system cost characteristics; and transit system impacts.

Available to Parsons Brinckerhoff for railroad consultation is the subsidiary firm of Parsons Brinckerhoff-CENTEC, Inc. (PBC). PBC was created to provide a full range of professional services for the railroad industry, PBC combines the multidisciplinary capabilities of Parsons Brinckerhoff with the specialized railway expertise of Central Technology, Inc. (CENTEC). PBC is well qualified to undertake complex and sophisticated railway planning, design, construction, and operation projects. CENTEC and its predecessor firm, Foley Brothers, Inc., have specialized in railroad work. This experience dates back to construction of the trans-continental railroads of North America. The design and construction of over 42,000 kilometers (26,000 miles) of railroad in North America and other parts of the world is in the

CENTEC background. The knowledge gained from this massive railroad experience has been carried over to CENTEC by its management and leading personnel. Current and continuing railroad research and consulting activities have added the most modern concepts and technology to this background knowledge.

In recent years, CENTEC has performed the system design, railroad location, and engineering design of eight new railroads totalling over 3800 kilometers (2300 miles) of main line length. It has studied the feasibility or comparative economy of an additional 7000 kilometers (4400 miles) of main line route. Its staff includes many qualified railroad location and design engineers supported by personnel with career experience in railroad operations and maintenance.

The combined attention of these location, design, and operating personnel is applied to new railroad location and design to achieve the optimum system location and design for both construction and operating economy.

CENTEC personnel include many individuals with career experience in the operation and management of all sizes and types of railroad systems from small, captive systems carrying a single commodity (usually ore) to common carried railroads composed of thousands of kilometers of main, secondary, and service lines carrying all types of freight as well as passengers. CENTEC personnel have had experience in all aspects of operation and management of such railroads, up to and including experience as president and chief executive officer.

Since the turn of the century, when General Parsons undertook the design of New York City's first subway system, Parsons Brinckerhoff has been continuously engaged in the study, planning and design of rail transportation facilities. Railroads have been planned as part of the transportation networks of regions and states, as well as entire nations. Specific applicable assignments include:

- Southern Pacific Railroad Study, San Francisco, California: For the California State Department of Public Works, Division of Highways, Parsons Brinckerhoff Quade & Douglas, in association with James W. Diffenderfer, conducted an evaluation and analysis of the effects of the Interstate I-280 Freeway on the railroad operations and facilitis of the Southern Pacific Company, in an area of concentrated railroad activity located near downtown San Francisco.

This study included consideration of railroad operating strategies, volumes, patterns, services, and physical facilities, and effects on operating expenses and revenues. It also included evaluation of various kinds of possible hazards, determination of properties necessary for railroad use, related freeway design and construction aspects, curative measures as found to be necessary, and provision of court testimony.

- Railroad Yard Evaluation Study, Portland, Oregon: For the Oregon State Highway Department in 1964 the firm prepared a railroad transportation evaluation and property appraisal of the East Portland Yard facilities of the Portland Traction Company. The Oregon State Highway Department was then in the process of designing the Marquam Bridge across the Willamette River on the East Bank Freeway in Portland. The interchange structure on the east side of the river passes over the East Portland Yard of the railroad. The study provides four alternate plans for relocation of the affected railroad and warehouse facilities, appraises the functions and costs of the existing facilities in the yard area, and estimates the costs to the Highway Department of the alternative proposed relocation plans.

- Long Island Railroad Modernization Program: The Metropolitan Transportation Authority of New York State retained Parsons Brinckerhoff Quade & Douglas, in joint venture to develop a $200 million modernization program for the Long Island Rail Road. The purpose of the program was to provide service to people within the railroad's service area, to retain existing riders, and to attract new riders so that the railroad could better fulfill its function in the Metropolitan Region's total transportation system. The significant aspects of the program involved: station redesign for coformity to new car characteristics, redesign of the main transfer terminal at Jamaica, extension of electrication, specifications for new cars, and specifications for new track and signal systems.

Phase I improvement involved: preparation of final specifications for car modernization, a car selection and electrification program, data collection and projections, and development of system criteria and evaluation of specific project elements including preparation of a work program and mobilization. The Phase I electrification program has been completed. Specifications for the cars covered such items as alternative materials; car body; coupler and draft gear; door control and signal system; heating, ventilation, and air conditioning, lighting; auxiliary power system and apparatus; propulsion system, brakes, controls, and accessories; and trucks. Cars designed to these specifications have been received, and are now in service.

- Railroad Safety Standards Research, Federal Railroad Administration: The Railroad Safety Act of 1970 required the Federal Railroad Administrtion (FRA) to establish specific safety standards for the United States railroads for the first time. Because of its wide knowledge of U. S. and foreign railroads, CENTEC was engaged by the FRA on a sole source basis to research the state-of-the-art of railroad safety standards and practices throughout the world and to correlate safety standards with historical accident data as a basis for the new U. S. standards.

The CENTEC assignment included collection of such existing safety data, accident investigation reports and test results, as were obtainable from operating railroads, research organizations, railrod associations, railroads labor organizations, and manufacturers throughout the world. In all, some

2500 reports or papers on relevant railroad safety subjects were collected. These data were assembled and correlated into a comprehensive body of knowledge that would support a rational determination of FRA priorities and serve as a basis for establishment of initial safety standards. Such priorities and initial standards were formulated and recommended.

- Black Mesa and Lake Powell Railroad, Arizona: CENTEC was engaged by the power and water public utility, Salt River Project, to review proposed remedial measures for its Black Mesa and Lake Powell Railroad. The 126 kilometer (78 mile) BM&LP had been put into service 18 months earlier for the unit-train haul of coal to the 2,250 megawatt Navajo power generating station near the town of Page on Lake Powell in Arizona. The railroad had developed and was experiencing numerous problems with its track, motive power, rolling stock, and operations.

In the space of three months, CENTEC reviewed the problems and proposed remedial measures and recommended alternative solutions to the problems that saved the Salt River Project over $30 million in remedial costs. CENTEC was retained to supervise implementation of its recommendations, to regularize operations and maintenance of the railroad, and to design the supplementry facilities required for a 50% increase in haulage capacity. In the process, CENTEC prepared a complete "Rule Book" for BM&LP operations.

- Evaluation of Passenger Track Conditions, ANTRAK: CENTEC was called on to inspect the mainline trackage of the Illinois Central Gulf Railroad between Chicago and New Orleans, some 1485 kilometers (920 miles) of multiple track line. Passenger service over this line had been unsatisfactory in terms of passenger comfort and behind schedule operations. The identification of locations and need for upgrading and improved maintenance to improve riding comfort, increase train speeds and reduce the number and extent of slow orders were accomplished by foot-by-foot inspection and evaluation of track condition and potential for upgrading. An inventory of condition and recommended plan for upgrading were prepared and submitted to AMTRAK for its use in negotiations with the ICG Railroad.

- Philadelphia Center City Rail Connection: The Philadelphia Center City Commuter Rail Connection project is a prime example of the wide range of services that can be provided by our firm. The project, which began in April 1978, consists of construction of a 1.7 mile, 4-track structure, including tunnel and viaduct components and a new underground through station, to provide a rail connection between two existing Conrail systems. Parsons Brinckerhoff is the leader in a joint venture formed specifically to provide construction management services to the City of Philadelphia, so as to facilitate the construction of this complex $260 million facility in the heart of Philadelphia with a minimum of disruption.

Coordination management services being provided include communication and coordination among the city, contractors, railroads, South Eastern Pennsylvania Transportation Authority (SEPTA), utility companies, and other affected agencies; assistance in negotiation with government agencies;

participation in community relations activities; reviewing contract documents; reviewing traffic maintenance and construction staging plans; participating in prebid, bid, and contract award activities; supervising building and structural surveys; developing a project control system; providing construction inspection; monitoring safety, health, air pollution, and noise control measures; developing and implementing a quality assurance program; maintaining job control, progress reports, and records; checking progress payments; verifying shop and working drawings and catalog cuts; and testing materials and samples. In addition, upon completion of each prime construction contract, the joint venture will inspect the work, detail all omissions or deficiencies, and upon correction of deficiencies, recommend acceptance of the project and approve the final payment to the contractor.

Staff from Parsons Brinckerhoff have been involved in a number of recent projects in the areas of transportation planning and transportation center design. Briefly summarized, these projects include the following:

- San Francisco Transbay Terminal: Parsons Brinckerhoff, as the lead in a joint venture is preparing a development program for Transbay Terminal to enlarge the facility to accommodate 1995 bus commuter traffic in downtown San Francisco. The program will incorporate an inter-city terminal for Greyhound and Continental Trailways into this Transbay facility. The commuter facility will include some 70 bus berths to accommodate approximately 700 rush hour buses carrying 25,000 persons.

The inter-city facility will have 40 bus berths nd handle approximately 200 arriving buses and 200 departures daily. The program will provide for mixed uses within the terminal, restaurants, shops, etc. These uses will not only provide a source of income to the terminal but with the new long haul bus terminal create activity within the facility throughout the day, thus reducing the sense of vacancy which is normally a part of commuter facilities during the day.

As a part of this program, Parsons Brinckerhoff is preparing the transportation program for interface with San Francisco's transit systems. Flow of pedestrians, conflict with automobile traffic, the downtown congestion and parking facilities are to be addressed within the Terminal Program.

- Dallas Transportation Terminal Study: The restoration and redevelopment of the Dallas Transportation Terminal as a multimodal transportation terminal is a major element in the revitalization of the central business district (CBD) of Dallas. Parsons Brinckerhoff was engaged by the City of Dallas, Texas, to study the impact of the restoration on local air quality, noise levels and traffic impacts. The firm developed an environmental impact assessment and studied traffic and pedestrian flows, parking requirements, demands for various transportation modes, and demand for transportation uses of the building. Design modifications and street improvements were recommended as a result of the study.

Originally called the Union Terminal, the building, located near the Trinity River in the oldest and most historic section of Dallas, is entered in the National Record of Historic Places. Completed in 1916, it served as many as 85 trains a day for nine railroads. With the decline of the railroads, the last tenant discontinued passenger service in 1969, and the historic structure fell into disuse and disrepair. When it was learned that the building might be destroyed, the city purchased the 25-acre site in 1972 and subsequently entered into an agreement with private interests to develop the adjacent area in a cooperative effort.

Parsons Brinckerhoff reported that the Dallas Transportation Terminal project and plans for the surrounding area will not adversely affect natural, ecological, and scenic resources; will not significantly affect air and noise quality; will provide important transportation alternativies to the motoring public; and is in harmony with the established goals and objectives of the commmunity.

- Fort Worth Transportation Center Site Analysis and Preliminary Design: The City of Fort Worth and the North Central Texas Council of Governments retained Parsons Brinckerhoff to prepare site analysis and preliminary design for the Fort Worth Metropolitan Transportation Center to be located in the city's Central Business District (CBD). This project involved six basic tasks: Development of site selection criteria for use in selecting no more than three alternative sites for project development. Development of design criteria for use in determining minimum requirements and in creating preliminary designs. Evaluation of alternative sites and selection of a final consensus location. Development of detailed preliminary engineering/architectural plans and cost estimates. Analysis of traffic patterns and development of bus routings to and from the Transportation Center. Review of socioeconomic and environmental impacts of the facility.

The City of Fort Worth has been especially interested in maintaining and enhancing the role and vitality of its Central Business District. This interest has generated concern over the flow of traffic in the district and over the ability of existing and future transit facilities to meet the needs of the public, particularly in traveling to and from the CBD. The City has, therefore, sought to develop a balanced system of transportation which includes an integrated bus and rapid transit system for the entire metropolitan area with special focus on the CBD. This focus is directed toward one single component-a downtown surface Transportatin Center-which will become the single most important element in the entire metropolitan system. Parsons Brinckerhoff has completed all six tasks in this project. The firm has selected alternative sites and has prepared a study of their environmental and socioeconomic impacts. Because this information is now being reviewed by the City of Fort Worth, no decision has yet been made regarding the final site for the Transportation Center.

- Boston South Station Planning, Design and Reconstruction: The main building of Boston's famous South Station, once a major center of railroad activity, will be reconstructed over the next few years under the auspices of the Boston Redevelopment Authority with PBQ&D providing continuous consulting services. The firm's responsibility includes all design and technical aspects of the reconstruction effort--preliminary engineering, site planning, demolition, planning of temporary bus facilities, preliminary design of the new Transportation Center, and coordination of various objectives from public and private groups and agencies for design input. Because the Boston Redevelopment Authority is committed to maintaining transportation services during the reconstruction work, the firm has coordinated its work effort to allow updating to proceed while non-functional areas are eliminated. When completed, South Station will incorporate bus, rail, and rapid transit travel modes, related service facilities, shops, offices, and pedestrian walkways.

- Grand Central Terminal Alternative: As a leader in a joint venture, Parsons Brinckerhoff, a consultant to the vTA, performed a technical study and evaluation of Grand Central Terminal as an alternative location for the LIRR east midtown terminal. Eight schemes were formulated, analyzed, and evaluated; two of these were further analyzed to determine their impact on present operations of ConRail's Metropolitan Region (MR) ad AMTRAK in Grand Central Terminal; and one of these two was identified as the most feasible solution and was studied and defined in detail.

ENVIRONMENTAL IMPACT PLANNING CORPORATION QUALIFICATIONS

Environmental Impact Planning Corporation (EIP) was founded in 1968 to provide the highest quality environmental consulting services. The firm specializes in environmental analysis and has completed more than 250 environmental statements, reports and assessments in the last 10 years. EIP is experienced in conducting specialized studies, such as pollution control and waste management, development suitability, climate and wind studies, and studies concerning land use analysis and the ecological carrying capacity of land and marine areas. The company's principal office is in San Francisco.

EIP's approach to the environmental reporting process involves the interaction of a multidisciplinary team. EIP has a permanent staff of environmental professionals in the disciplines of air quality, aquatic and terrestrial biology, economics, energy resources, civil and industrial engineering, environmental law, geology and soil mechanics, hydrology, landscape architecture and urban design, meteorology, oceanography, land use planning, sociology, and water quality. The technical staff is augmented by consulting specialists in noise, transportation, archaeology, and other environmental fields.

EIP has water, air, and acoustics monitoring capabilities and operates a boundary-layer wind tunnel designed by staff scientists. This tunnel has a 5' x 7' cross section and a 44' long testing section. It can be used for studies of wind flow around buildings and terrain, pollutant dispersion, building surface pressures, and structural dynamics. It is the only privately operated wind tunnel in the western United States appropriate for these purposes.

To support the research needs of the staff, EIP maintains a 10,000 volume environmental library. This media resource center contains a broad range of books, reports, studies, general references and statistical materials; numerous periodicals of specialized environmental disciplines are also available to the staff. The collection constitutes a private depository of local, state and federal government publications that relate to environmental studies.

EIP maintains a complete graphics studio for preparing all illustrative materials required in its reports. Much of EIP's work involves the use of overlays requiring precise registration for which the firm is suitably equipped. In addition, the graphics production staff is experienced in preparing public communication documents, including large charts, diagrams, and other displays in black and white or color, for use at public hearings and citizen participation meetings.

EIP's reports are written to meet all the requirements of the California Environmental Quality Act. The reports are technically accurate and easily understood by the layman. The firm has enhanced the environmental study process by developing various citizen participation techniques to draw the public into the study, solicit community input, and improve both the public's and the consultant's understanding of the issues.

Many of the over 250 environmental impact studies prepared by EIP have been on transportation systems, including transit. Two projects have been selected as particularly relevant examples of EIP's past work.

The U.S. 395 EIS was a large interdisciplinary study conducted for the Nevada Department of Highways. In this study, EIP dealt with transit options, federal historical requirements for four (f) statements, and the relationship between a Draft and Final EIS after a recommended alternative was selected. Russ Faure-Brac, EIP's designated Principal-in-Charge for the J-Line Study, was project manager for the U.S. 395 EIS.

The Regional Wastewater Solids Study is another example of a related study. EIP prepared the environmental analysis for this project which investigated alternatives for treatment and reuse of sewage sludge. EIP prepared a report meeting both CEQA and NEPA requirements and worked with an engineering consultant who had a parallel contract in the study.

Descriptions of these studies follow. We encourage you to contact the references for information on EIP's experience and ability to perform. Also listed are summaries of several other projects which illustrate EIP's experience with transportation projects and projects in the San Francisco area.

U.S. 395 Corridor Environmental Impact Statement, Nevada

This $700,000, two-year study involved an analysis of various alternative alignments for upgrading U.S. 395 to freeway status between the Carson City-Washoe County line and Panther Valley, six miles north of Reno, a total distance of 27 miles. In studying alternative alignments for the freeway, a detailed and comprehensive resource analysis was conducted of the Truckee Meadows, a 250-square-mile study area. Over the last 10 years, the Truckee Meadows has been one of the fastest growing population centers in the country; thus careful analysis of the relationship of the freeway to other regional land use planning activities was required.

EIP and its subconsultants compiled data and mapped resources in the areas of geology and soils, hydrology and water quality, vegetation and wildlife, historic and archaeological sites, climatology, noise, transportation facilities and needs, demographic projections, neighborhood characteristics, regional and local economics, and agricultural and other land uses. The study also required coordination with a concurrent basin air quality study.

Controversy had surrounded the proposed freeway for many years; past efforts by the Nevada Department of Highways to build it had been impeded by court actions. As part of its research methodology, therefore, EIP held more than 50 meetings with interested community groups to assess the affected communities' attitudes toward the various project alternatives.

Contact: Laurnal Gubler, Supervisor
Roadside Development and Environmental Services
State of Nevada, Department of Highways
1263 South Stewart Street
Carson City, Nevada 89712
(702) 855-5490

Regional Wastewater Solids Study, San Francisco Bay Area

EIP assessed the environmental and social impacts of wastewater solids processing and disposal throughout the nine-county San Francisco Bay Area. The information developed and the criteria identified by EIP are being incorporated into a concurrent facilities planning process, and the study will culminate in a joint EIR/EIS on the facilities plan. The analyses EIP conducted and reported were directed toward determining land areas appropriate for disposal and investigating disposal techniques. EIP designed a review procedure for the EIR/EIS because of the multiple jurisdictions involved, and the firm is contributing to the community participation program being coordinated by the Study Staff.

Contact: Henry Hyde, Study Manager
San Francisco Bay Region Wastewater Solids Study
3505 Broadway, Suite 815
Oakland, California 94611
(415) 547-6550

Oak Road Extension EIR, Contra Costa County

The Oak Road extension is a connector road to facilitate vehicular access to the Pleasant Hill BART station. Issues demanding special scrutiny were air quality, noise, traffic congestion, and possible growth-inducing impacts on surrounding residential areas. The proposed plan was found to contribute in a small but important way to saving motor vehicle fuel and reducing local air pollution. These savings would result from promotion of the use of the BART system. In addition, the conduit-like design is expected to keep the roadway from contributing to the growth of adjacent residential areas.

Downtown Pedestrian Circulation and Urban Goods Movement Study, San Francisco

EIP will be preparing the environmental evaluation portion of the Downtown Pedestrian Circulation and Urban Goods Movement Study for Wilbur Smith and Associates under contract to the City of San Francisco. The study's purpose is to develop and implement a coordinated system of transportation improvements within downtown San Francisco designed to improve circulation, while reducing the impact of the private vehicle, particularly the private commuter vehicle, on the downtown core. EIP will focus on the issues of noise, air quality, energy and safety.

Willow Road Improvement Project EIR, Palo Alto

This project involved improvements on two miles of Willow Road in Palo Alto, including widening it to four lanes and extending it to connect to El Camino Real. The road borders undeveloped Stanford University lands, a large apartment complex, commercial offices, Stanford Medical Center, and Stanford Shopping Center. Major issues included effects on traffic circulation patterns, recreation and open space, loss of trees, visual and aesthetic impacts, economic impacts on the shopping center, and the relationship of the project to the previously proposed Willow Freeway. Considerable controversy had surrounded the project, and EIP held a community workshop to assure responsiveness to local concerns.

West Side Transport/Storage Project EIR, San Francisco

EIP was selected by the City of San Francisco to prepare an EIR on a two-mile-long consolidation sewer along the City's Ocean Beach, and a pump station west of the Zoo. The sewer, a concrete box culvert 25 feet wide at its northern end and 50 feet wide by 36 feet deep at its southern end, is part of the City's Wastewater Management Program, designed to reduce discharges of untreated sewage and storm runoff from 80 to an average of one per year. During rainy weather, flows exceeding the capacity of the proposed Southwest Treatment Plant would be held in the sewer until treatment capacity became available.

Since the Upper Great Highway would have been torn up for the construction of the West Side Transport Project, the City proposed to improve the Great Highway corridor and redesign the roadway. One of the community workshops that EIP conducted as part of the EIR process was devoted to obtaining input from neighborhood groups and residents of the area in formulating criteria for the design of the Great Highway, bike and horse paths, pedestrian access to Ocean Beach, and parking and other facilities.

B Street and Center Street Widening Project EIR, Hayward

This project involved widening B Street and Center Street, major thoroughfares connecting several towns in Alameda County. The original project proposed closing a bridge over San Lorenzo Creek for a year. Because this closure was found to have major adverse effects on the neighboring community, an alternative had to be developed. Beneficial effects of eliminating a traffic bottleneck were weighed against loss of visual quality and vegetation, increased noise, possible lowering of residential property values, and accelerating the change of a residential neighborhood to a commercial district. By producing a thorough environmental document, EIP kept controversy surrounding the project focused on the pros and cons of the various alternatives, their impacts and proposed mitigation measures, rather than on the EIR itself.

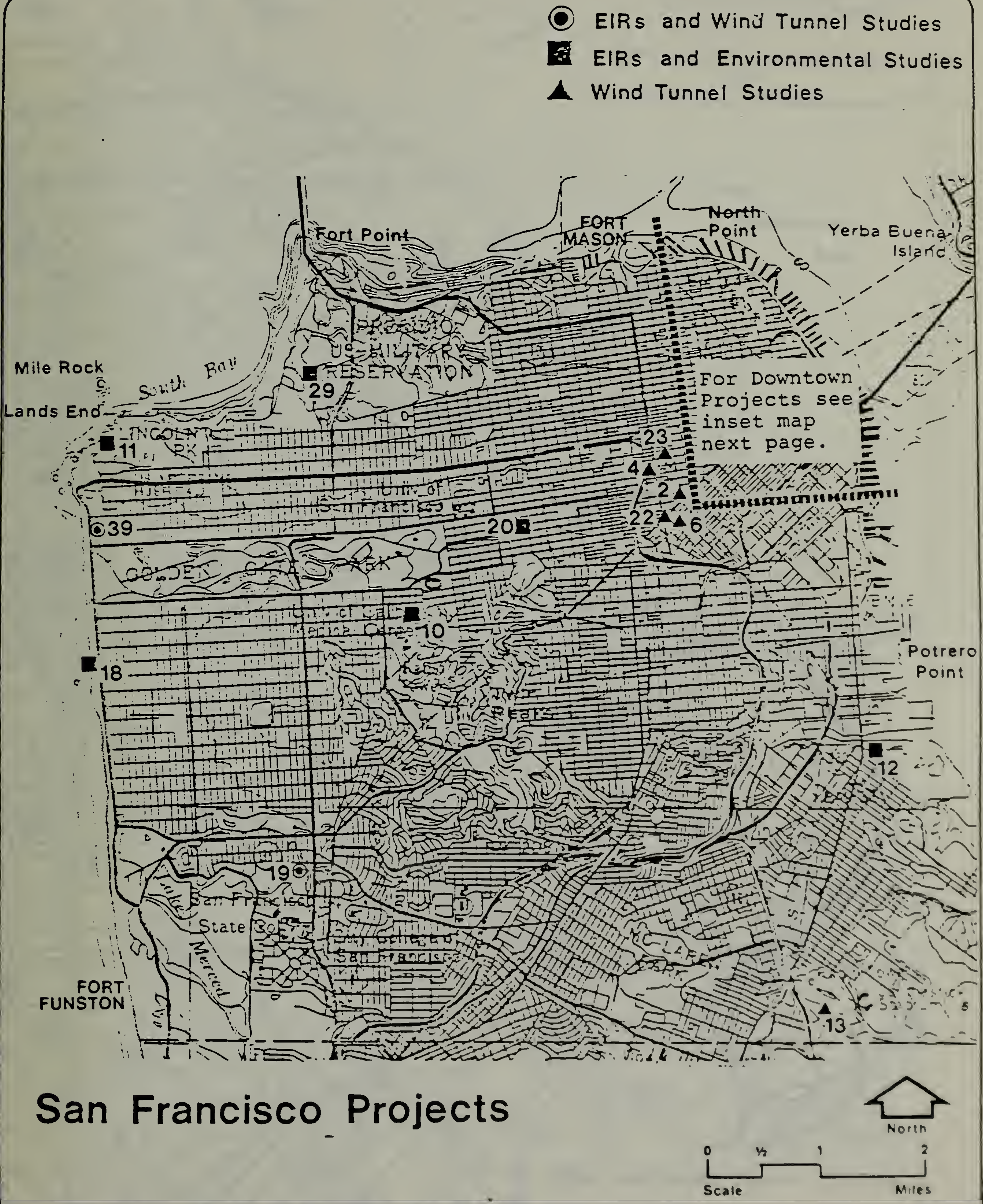
East Washington Street Improvement Project, Petaluma

The City of Petaluma retained EIP to prepare an environmental assessment for the East Washington Street Improvement Project, which involved widening one-half mile of an urban street from 40 to 52 feet. Major issues included noise impacts on adjacent parklands, residences, and businesses; visual impacts; and the population growth-inducing aspects of accommodating more readily future traffic demand.

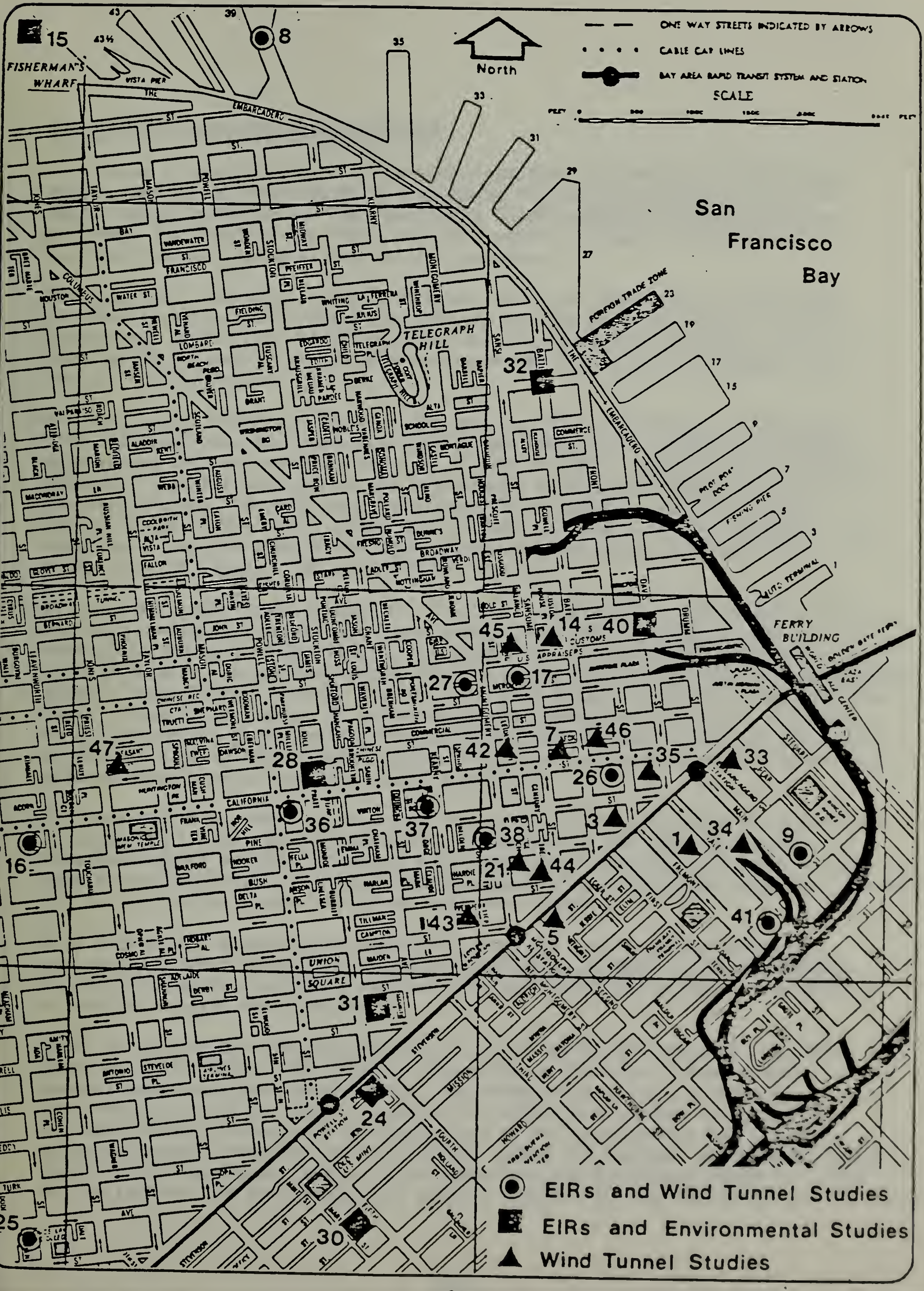
EIP has had extensive experience in the environmental analysis of a wide range of projects in the City and County of San Francisco. The following material summarizes that experience.

SUMMARY OF EIP EXPERIENCE
WITH SAN FRANCISCO PROJECTS

1. Bechtel Buildings
2. State Compensation Insurance Fund Building
3. Shaklee Building
4. Philippine Trade Center
5. 595 Market Street Building
6. Bank of America Data Center
7. Bank of Tokyo Building
8. Pier 39
9. Howard and Main Office Building
10. University of California, San Francisco, Long Range Development Plan
11. Golden Gate National Recreation Area
12. Islais Creek Outfall Consolidation
13. San Francisco Executive Park
14. U.S. Appraiser's Building
15. Pier 45
16. Nob Hill Towers
17. 505 Sansome Street Building
18. Westside Sewage Transport Project
19. Stonestown Shopping Center
20. San Francisco Post Office
21. Montgomery-Bush Highrise
22. Market-Van Ness Microclimate Study
23. Eastern Park Apartments
24. Apparel Mart
25. Hastings Law Center
26. Front and California Street Building
27. Montgomery-Clay Office Building
28. Chinatown Housing Project
29. Presidio Climate Study
30. San Francisco Newspaper Printing Company Expansion
31. Neiman-Marcus Specialty Store
32. Levi's Plaza
33. Federal Reserve Bank
34. Gateway Plaza Building
35. Itel Headquarters Building
36. California and Powell Condominiums
37. Pine and Kearny Hotel
38. Montgomery-Bush Highrise
39. Ocean Beach Park Estates
40. Pedestrian Circulation and Urban Goods Movement Study
41. 315 Howard Street Building
42. 456 Montgomery Street Building
43. Crocker Bank Headquarters
44. 1 Sansome Street Building
45. Pacific Lumber Company Building
46. Daon Building
47. Sacramento-Jones Street Building



San Francisco Projects


ONE WAY STREETS INDICATED BY ARROWS
CABLE CAR LINES
BAY AREA RAPID TRANSIT SYSTEM AND STATION
SCALE
North
San Francisco Bay
FISHERMAN'S WHARF
THE EMBARCADERO
TELEGRAPH HILL
FOREIGN TRADE ZONE
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EIRs and Wind Tunnel Studies
EIRs and Environmental Studies
Wind Tunnel Studies

E. M. ROSE & ASSOCIATES QUALIFICATIONS

E. M. Rose & Associates offers consulting services in planning, architectural design, and in the development of data bases for the preparation of environmental impact assessments. ERA is a newly formed minority business enterprise. Mr. Rose, principal of the firm, has had a number of years of experience as an urban and environmental planner and architect.

With Parsons Brinckerhoff Quade & Douglas, Inc., Mr. Rose gained a wide range of experiences in architecture and planning working as chief planner for the preparation of EIR for the Metropolitan Atlanta Rapid Transit System. Mr. Rose also headed Parsons Brinckerhoff's environmental planning and management team for the Western Region.

Mr. Rose's involvement in Bay Area projects has given him intimate familiarity with the California Environmental Quality Act Guidelines as well as knowledge of planning and environmental concerns in the Bay Area. Selected local projects which Mr. Rose has had substantive involvement in include: Stanford Resource Recovery Project, General Electric Boiling Water Reactor Facility and the Emergency Operations Center Study for the City and County of San Francisco. His experience includes significant involvement in major commercial, industrial, transportation, transit and recreational projects.

Mr. Rose was supervising planner for the $2 billion MARTA project. Responsible for the supervision, coordination and operation of all planning activities including land use, environmental, transportation and social planning functions. In this capacity he was responsible for the preparation of the EIR for Metropolitan Atlanta Rapid Transit (MARTA) System. The MARTA system is the first metropolitan transit program in the nation to have complete federal environmental approval. He has served the joint venture Parsons Brinckerhoff/Tudor Engineering Co. (PB/T) as project manager for multidiscipline design team on segments of the Metropolitan Atlanta Rapid Transit Authority (MARTA) stations.

Mr. Rose served as senior planner for the joint venture of Parsons Brinckerhoff-Gibbs and Hill, the general engineering consultant to the Port Authority of Allegheny County for the Pittsburgh Light Rail Transit Project. In this assignment he was responsible for developing elements of the Pittsburgh Light Rail Transit EIR as well as the system safety and security criteria.

As a part of the Seattle MetroTRANSITion Study Mr. Rose was responsible for the review of environmental criteria and guidelines as well as the development of design concepts, including architectural and functional planning components of various transit alternatives.

Prior to joining Parsons Brinckerhoff, Mr. Rose served with several West Coast planning and architectural firms, particularly in the area of mass transit, general transportation, urban design, comprehensive land use, community development as well as various projects for public and private clients. The multidisciplinary experience and background of Mr. Rose enables the firm to offer recognized expertise in architecture, urban and regional planning including land use, environmental, social, site selections and locational analysis. Other skills include land development and project coordination and management capabilities

The firm's design background and experience have given it a sensitivity and awareness of problem solving and practical cost effective solutions. Mr. Rose is experienced in developing design solutions for adverse environmental impact of development projects. Mr. Rose has been substantially involved in and is familiar with citizen participation and review process programs.

J. WARREN & ASSOCIATES QUALIFICATIONS

J. Warren & Associates was formed in 1977 to provide professional consulting services in civil engineering, transportation and planning. The firm is a wholly minority owned small business enterprise. J. Warren & Associates undertakes assignments in the areas of transportation facility design including highway and rail; transportation planning; traffic engineering; and, transport economics. The projects listed below are representative of the firm and its staff members.

GREAT HIGHWAY SCENIC REDESIGN PROJECT

J. Warren & Associates was selected as part of a team headed by Michael Painter & Associates to redesign the existing Great Highway at Ocean Beach in San Francisco. The project involves changes in horizontal alignment, lowering the road profile, flattening of roadway side slopes and new parking lots and pedestrian access structures. Responsibilities include geometric design, traffic analysis and parking lot analysis and design.

OAKLAND AIRPORT TRANSIT CONNECTOR SYSTEM

J. warren & Associates was selected as part of a team headed by Kaiser Engineers for the design of a 3.8 mile transit system to connect the BART Coliseum station and Oakland International Airport. Responsibilities include geometric design of transit route, preparation of capital cost estimates, analysis of right-of-way requirements, and preparation of utility relocation plans.

URBAN FREEWAY DESIGN (California Division of Hifhways)

Member of team that designed a portion of the Junipero Serra Freeway (I 280) in San Francisco and San Mateo counties. Responsibilities included geometric design, earthword calculations (using a combination of computerized and manual techniques), maintaining a computerized critical path diagram for project control, and preparation of contract plans, specifications and estimates of contract quantities and costs. (Warren)

Design of the easterly approach to the San Francisco-Oakland Bay Bridge and of the McArthur Freeway in Oakland. Directed planning studies for the Panhandle Parkway and Golden Gateway Freeway in San Francisco. Technical advisor on transport planning to Bay Area Cities an Counties as well as the Metropolitan Transportation Commission. (Crowell)

FREEWAY CONSTRUCTION MANAGEMENT

Construction Engineer for the joint freeway-rail rapid transit corridor for the Bay Area Rapid Transit District and the California Division of Highways in Alameda and Contra Costa counties. (Crowell)

Construction inspection on major urban freeways including a portion of the Junipero Serra Freeway in San Mateo county, including responsi-

SAN FRANCISCO BAYSIDE FACILITIES PLAN

Responsible for determining the impacts of construction activities on traffic flow and developing a plan to mitigate these impacts. The Bayside Facilities project will involve an estimated $500 million capital cost and a large amount of cut and cover construction activity that will cause major disruption of the city's street network.

MOBILE HOME PARK DESIGN

J. Warren & Associates was engaged for the design of an 88-space mobile home park with open space and recreational facilities in Suisun City, California. Responsibilities included conceptual design, detailed design of streets, drainage and grading, parking lots, utilities, site improvements, coordination, and preparation of contract plans, specifications and estimates of quantities and costs.

OAKLAND AIRPORT TERMINAL EXPANSION

Responsibilities include design of site improvements including new pile supported sidewalk, curbing and paving for baggage-cart operations area.

CHARLES M. SALTER ASSOCIATES QUALIFICATIONS

Rail Transit Noise Analyses

Charles M. Salter Associates Inc. has extensive experience related to the environmental noise analysis of fixed rail transportation systems. The following discussions are representative of the types of projects we get involved in.

Forest Hills Station. We are presently the subconsultants for the noise analysis for the EIR being prepared by Esherick, Homsey, Dodge and Davis for the Forest Hills Station Transit Improvement project in San Francisco. Environmental noise impacts of the construction of this station will be investigated. In addition the positive environmental impact of removing buses from the street level will be evaluated, and suggestions for quieting the waiting areas in the station will be made.

Muni Turnaround. As subconsultant to EDAW, Inc. we prepared the noise sections for the EIR for the underground Muni Turnaround at the end of Market Street. Because this would be an underground facility, primariy impacts were associated with the construction activities. Specifically the impact on street vendors, the Hyatt Regency hotel and other adjacent sensitive uses was evaluated and construction impact and mitigation measures were suggested.

Transbay Terminal EIR. Again with the firm of EDAW, Inc. we recently completed an evaluation of the environmental noise impacts associated with the construction of a new Transbay Terminal. This study was prepared for UMPTA and the City and County of San Francisco, and involved environmental noise measurements, assessment of the impact of various alternative bus routing schemes, and suggestion of mitigation measures.

In addition to these studies we have done numerous other rail transit jobs. A representative list of these follows.

Client	Project
KPIX-TV Channel 5 San Francisco, CA.	Evaluation of BART Train noise levels just after the opening of the Daly City section. Citizens' complaints to KPIX triggered this investigative study.
Reimer Associates Burlingame, CA.	Determination of the environmental nosie impacts associated with the upgrading and corresponding traffic increase along 2,000 miles of railroad track between El Paso, Texas and St. Louis, MO.
City of Concord Concord, CA.	Development of noise exposure contours for the City of Concord, CA. Noise exposure contours for the BART track through Concord were developed based on a combination of measurement and computational techniques.

Client	Project
Hardison & Komatsu, Architects San Francisco, California	An assessment of the impact of BART noise on a proposed elderly housing development in San Leandro. Recommendations for building construction and orientation were made to reduce noise exposure of the living units.
Madison Motor Inn Boston, MA.	Measurement of the intrusion of rail transit noise into a motel. Construction modifications were recommended to significantly reduce intrusive noise.

DD & A CONSULTANTS, INC. QUALIFICATIONS

DD & A Consultants, Inc., is a multi-disciplined minority owned consulting firm providing services in the area of energy, environment, construction and central city development.

Although the firm is experienced and equipped in a variety of disciplines, our current concentration has been in the wastewater and solar energy programs. Other areas in which we have involvement include private land development, utilizing the redevelopment funding mechanisms.

Professional services include:

- Civil and Municipal Engineering;
- Land Surveying - Includes construction staking, topographic, hydrographic, planimetric, control and boundary surveys (including ALTA Surveys);
- Sewer System Evaluation Surveys - Includes flow monitoring, physical inspections, smoke testing, rainfall simulation, cleaning and internal inspection of sewer lines;
- Construction Services - Includes inspection, management, estimating, scheduling and preparation of "as-builts".

DD & A Consultants, Inc., is currently staffed by approximately 25 professionals and Technicians. The cross-section of expertise within the firm is experienced in major projects such as highways, ports, transmission lines, treatment plants as well as large scale residential, commercial and industrial land development projects.

Principals in the firm are licensed or registered in Land Surveying, Civil Engineering, Engineering and Building Construction, Real Estate and Law with over 20 years of experience each.

Other key members average well over ten years of experience each. The survey crews are all members of Operating Engineers Union, Local #3.

The staff is equipped with and experienced in the use of the latest in field and office equipment.

Surveying and mapping is one of our primary activities. The firm is licensed to practice Land Surveying in the States of California and Nevada. Survey Services include boundary, control, topographic, planimetric, hydrographic and construction surveys. The firm uses the latest equipment and most up-to-date methods in performing its various survey services. The survey staff is experienced in a variety of survey services. Typical projects include land division, control surveys for photogrammetric mapping, construction staking on major projects - wastewater, highway, development, etc. - as well as miscellaneous surveys including ALTA Surveys.

LOUIS T. KLAUDER AND ASSOCIATES QUALIFICATIONS

Louis T. Klauder and Associates has participated in the design and implementation of more rail transit subsystems than any other firm in North America. It is a leader in the design, specifications and quality control of rail transit vehicles and associated support systems. In addition, Klauder is in the unique position of being the only firm of consulting engineers in the United States that has managed and operated a new rapid transit system.

The Lindenwold High-Speed Line, owned by the Delaware River Port Authority and operated by its subsidiary, the Port Authority Transit Corporation (PATCO), is widely acclaimed as the most successful of the three new rapid transit systems (the others are BART and WMATA) placed under construction in the 1960's. The Lindenwold Line operates frequently and reliably. Its operating costs are low and in four out of its nine years of existence, it has produced an operating "surplus", and its patronage is still growing, limited only by available cars (94.6% normally see daily peak period service) and available parking spaces at suburban stations.

Transit industry professionals often regard the Lindenwold line as the "showcase" of the Klauder firm. Louis T. Klauder, Sr., its Managing Partner, did the original feasibility study leading to project implementation because of its low cost approach. Subsequently, the Klauder firm prepared the specifications for PATCO's 75-car fleet (and the 46 additional cars now on order); conceptualized its non-computerized automatic train control/automated train operation (ATC/ATO) cab signal system -- one that permits full-speed manual override with safety; and implemented its unattended stations, self-service proof-of-payment magnetic ticket fare collection system. In addition, though not widely known, the Klauder firm provided the top management for PATCO during its three and one-half year start-up phase, including the first two years of revenue service operations. During this period, while the Klauder firm was recruiting most of PATCO's present staff and setting up its operating and managerial procedures, the then General Manager of PATCO was full-time Klauder employee. When this initial period was over, the Klauder firm stepped back, leaving a fully staffed and functional rapid transit line in place.

In addition to this example of its work, the Klauder firm has had or now has numerous light rail transit assignments, running the gamut from initial feasibility studies through systems engineering to procurement-related engineering services. Its clients which operate or are now building light rail transit systems include Calgary, Cleveland (Shaker Heights), Edmonton, Philadelphia, Pittsburgh, Rio de Janeiro and San Francisco. In addition, it has completed light rail transit feasibility analyses in Baltimore, Dayton, northern New Jersey, and Toronto; Klauder's transit signal system work has been in Boston, Calgary, Philadelphia, Portland, southern New Jersey, San Francisco and Sao Paulo. It's traction power assignments have been in Boston, Brisbane, Calgary and Philadelphia; Klauder's fare collection experience is in Denver, Edmonton, Memphis, Miami, New York, Philadelphia, Pittsburgh, Portland, southern New Jersey and San Francisco.

LIGHT RAIL TRANSIT EXPERIENCE

Louis T. Klauder and Associates has assisted clients with all phases of light rail transit system development: initial feasibility studies, preliminary engineering, design of system elements, operations improvements planning and vehicle acquisition programs.

In addition to the work listed below, Louis T. Klauder and Associates has participated in several regional transit alternatives studies which have included consideration of light rail transit. This work has been performed for clients in Baltimore, Detroit, Los Angeles and southeast Florida. Following is a list of the firm's experience in all phases of light rail transit work except vehicle acquisition (which follows immediately).

1978 -	Tri-County Metropolitan Transportation District (Portland, Oregon): In joint venture with Parsons Brinckerhoff, Phase I of preliminary engineering for a 14-mile light rail line planned for the Banfield corridor. Klauder responsibilities include provision of project manager and completion of tasks related to passenger-carrying vehicles, electrification, signals, communications, fare collection, shop equipment and maintenance vehicles. Klauder also provided estimates of operating and maintenance staff requirements and costs.
1977 - 1978	City of Edmonton, Alberta: Analyze and evaluate alternative fare structures, levels and collection methods and identify and interim immediate action plan with emphasis on total coordination and compatibility between bus and rail services.
1977 - 1978	Port Authority of Allegheny County: As subcontractor to Parsons Brinckerhoff-Gibbs & Hill, analyze and evaluate fare collection systems with special emphasis on interface between proposed light rail vehicles and stations and impacts upon existing bus/streetcar system.
1976 - 1978	City of Calgary, Alberta: As subcontractor to DeLeuw Cather, Canada, Ltd., engineering services in the areas of light rail vehicles, signal systems, and electrification in connection with a feasibility study and engineering for a new light rail line in the City of Calgary.
1975	San Francisco Municipal Railway Improvement Corporation: As subcontractor to Wilbur Smith and Associates, participate in study for San Francisco Municipal Railway system in connection with the "phasing in" of new light rail vehicles on the "J" and "N" streetcar lines.
1974	Metropolitan Toronto Transportation Plan Review: As a subcontractor to Ammann & Whitney, study the feasibility of implementing light rail transit in the Scarborough Corridor. Klauder analyzed route and service characteristics, electrification, signals and communications, vehicles, stations and storage and maintenance facilities.

1974	Mayors' Committee for Better Commuting, (Bergen County, New Jersey): Preliminary analysis of methods for improving commuter service to suburban communities located in Bergen County, New Jersey on or along the West Shore Line of the Penn Central Transportation Company. Light rail and commuter rail modes were evaluated. High performance light rail transit service was recommended.
1974	Mass Transit Administration of the Maryland Department of Transportation: As subcontractor to Dalton, Dalton, Little, Newport, assist with the Baltimore Northern Central Preliminary Engineering Study, including evaluation of vehicle options (light rail, rapid transit and commuter rail), preparation of design criteria and definitive plans for train control and communications, analysis of security and surveillance requirements, noise and vibration problems, operating costs and train operations. Light rail was the mode recommended.
1973	San Francisco Municipal Railway Improvement Corporation: Field engineering services in connection with installation of wayside and carborne signal and communications equipment for control of 100 new light rail vehicles.
1973	Montgomery County Planning Commission (Dayton, Ohio): Technical and economic feasibility of a light rail transit facility in the Southeast corridor of the Dayton metropolitan region.
1973	Southeastern Pennsylvania Transportation Authority: Study and analysis of operating and maintenance facilities and practices now in use on two commuter railroad network lines, light rail systems and trolley bus lines serving southeastern Pennsylvania in connection with preparation of a Master Plan for public transportation improvements in the region.
1971	Delaware Valley Regional Planning Commission: In association with Wilbur Smith and Associates, analysis of operating feasibility and costs of a series of improvements to existing commuter railroad, rail rapid and light rail transit facilities in the corridor between downtown Philadelphia and Media, Pennsylvania.
1971	San Francisco Municipal Railway Improvement Corporation: Design of a new signal system for the Twin Peaks Tunnel, Sunset Tunnel and the new Market Street light rail subway.
1970	San Francisco Municipal Railway Improvement Corporation: Consulting support for an internal study of the operations of existing streetcar lines serving San Francisco and development of recommendations for line extensions, revisions and improvements for light rail service as the "Muni Metro" including better access to maintenance facilities and improved vehicle utilization.

LIGHT RAIL TRANSIT VEHICLE EXPERIENCE

Since 1973, the Klauder firm has assisted several domestic and foreign transportation agencies during the procurement of 243 light rail transit vehicles. During these assignments, Klauder has demonstrated light rail transit car-related experience involving: (1) preliminary design determination; (2) alternatives analysis and cost estimation; (3) preparation of detailed plans, specifications and bidding documents; (4) assistance during bid evaluation; (5) assessment of bidders' manufacturing capabilities prior to contract award; (6) detail design review and drawing approvals during manufacture; (7) resolution of vehicle/wayside interface problems with signal, traction power and other systems caused by the carbuilder's design/component selection; (8) inspection and quality assurance services during construction; (9) supervision of acceptance testing; and (10) assistance with retrofits and warranty claims after car delivery.

Assignments for which Klauder has performed some or all of the above services are:

1978 - 1981	Greater Cleveland Regional Transit Authority: Consulting engineering services, including Phase A - Design Review and Engineering Support; Phase B - Inspection and Testing Supervision; and Phase C - Program Follow-Up Services for 48 modified U.S. Standard Light Rail Vehicles to be manufactured by Breda Costruzioni Ferroviarie, S.p.A. Assignment commenced February 21, 1978, with Polytech, Incorporated, Consulting Engineers, a minority-owned firm, as subcontractor.
1978 -	Tri-County Metropolitan Transportation District (Portland, Oregon): In joint venture with Parsons Brinckerhoff, Phase I of the preliminary engineering study for a 14-mile light rail line planned for the Banfield corridor. Tasks include specific systems and interfaces/interactions of the overall system.
1977 - 1978	Port Authority of Allegheny County, Pittsburgh, Pennsylvania: As subcontractor to Parsons Brinckerhoff-Gibbs & Hill, complete responsibility for the evaluation of light rail vehicle alternatives, development of vehicle design criteria, estimation of fleet cost, and the preparation of draft specifications, and bidding documents for 55-80 modified U.S. Standard Light Rail Vehicles for use on the Stage I line of the Pittsburgh Light Rail Transit (LRT) Program.
1977 - 1978	Greater Cleveland Regional Transit Authority: Assistance during the evaluation of 20 separate bids for 45 to 67 light rail vehicles (depending upon seating capacity needed to supply not less than 4,000 seats) received from 10 manufacturers, plus follow-on assistance requested by the GCRTA General Manager upon the determintion of the lowest and best bid including: (1) participation in pre-award conferences with the apparent successful bidder; (2) assistance in establishing criteria and in evaluating the manufacturing capabilities of the apparent successful bidder through inspection of its main plant in Italy,

	plus technical visits to transit systems operating light rail vehicles and rapid transit cars designed and/or built by the bidder; (3) explanation of the findings of the previous efforts to the Urban Mass Transportation Administration as part of obtaining its prior approval of the intended award; (4) assistance to the GCRTA General Counsel in developing defense strategy and rebuttals for use in defeating a lawsuit filed against UMTA by an unsuccessful domestic bidder; and (5) assistance in drafting the proposed contract between GCRTA and Breda Costruzioni Ferroviarie, S.p.A. governing the procurement of 48 light rail transit cars for use on the Shaker Division.
1976 - 1980	City of Calgary, Alberta: As subcontractor to DeLeuw, Cather, Canada, Ltd., engineering services including preparation of specifications, assistance during contract negotiations, and design review, for 27 modified U-2 type light rail transit cars to be built for Siemens Canada, Limited by Waggonfabrik Uerdingen A.G. (Duwag) of West Germany, for use on a new light rail transit line. Follow-on engineering services to be provided as a subcontractor to Underwood McLellan and Associates, Limited during the construction and delivery of the cars include inspection, testing, acceptance and warranty supervision.
1976 - 1980	Companhia do Metroplitano do Rio de Janeiro, Brazil: Preparation of specifications for 68 Brazilian Standard Light Rail Vehicles for use on pre-Metro feeder routes being built by Rio Metro, including car layout, technical features, styling, performance and cost estimates. Follow-on engineering services provided to date have included assistance during bid evaluation and contract negotiations with the successful bidders (La Brugeoise et Nivelles of Belgium and Cobrasma of Brazil) and design review and engineering support services.
1973 - 1979	San Francisco Municipal Railway Improvement Corporation: Design review, engineering support, inspection, testing, acceptance and warranty supervision services for 100 U.S. Standard Light Rail Vehicles being manufactured by the Boeing Vertol Company.

FARE COLLECTION AND COMMUNICATIONS EXPERIENCE

The experience of Louis T. Klauder and Associates in fare collection and communication systems for rapid transit, light rail and bus systems is described below:

1978	Metropolitan Transportation Authority of the State of New York: Selected to conduct a technical study of a fully-automated fare collection system for passenger stations of the Long Island Railroad. J. Wesley Leas & Associates will function as a subcontractor to Louis T. Klauder and Associates for a portion of this study.
1978 -	Tri-County Metropolitan Transportation District (Portland, Oregon): In joint venture with Parsons Brinckerhoff, Phase I of the preliminary engineering study for a 14-mile light rail line planned for the Banfield corridor. Tasks include specific systems and interfaces/interactions of the overall system.

1977 - 1978	City of Edmonton, Alberta: Analyze and evaluate alternative fare structures levels and collection methods and identify an interim immediate action plan with emphasis on total coordination and compatibility between diesel bus, trolley coach and light rail transit services.
1977 - 1978	Metropolitan Dade County, Florida: As subcontractor to the Kaiser Transit Group and Wilbur Smith and Associates, analyze and evaluate fare structure and fare collection system alternatives for the Stage I Rapid Transit System as part of the Metropolitan Dade County Transportation Improvement Program.
1977 - 1978	Port Authority of Allegheny County: As subcontractor to Parsons Brinckerhoff-Gibbs & Hill, analyze and evaluate fare collection systems for Stage I of the Pittsburgh Light Rail Transit (LRT) Program. Special emphasis required in this assignment on interface with proposed vehicles and stations and impact on existing bus/streetcar system.
1977	Memphis Area Transit Authority: Pre-award evaluation of recording fare collection system designed for use on buses.
1976	Regional Transportation District of Colorado: Pre-award survey of the production capabilities and ability to make promised delivery of a manufacturer of recording fare collection equipment designed for use on buses.
1973 - 1975	Companhia do Metropolitano de Sao Paulo: Inspection and acceptance of communications equi;ment for a closed circuit television surveillance system under manufacture in the United Kingdom for installation in the new rapid transit system being built in Sao Paulo. Prepare maintenance procedures for this equipment.
1970 - 1971	San Francisco Municipal Railway Improvement Corporation: Preliminary designs and cost estimates for an automated fare collection system for the subway-surface system.
1968 - 1969	Delaware River Port Authority of Pennsylvania and New Jersey: Preparation of specifications and inspection of procurement and installation of an automated fare collection system and a closed circuit television surveillance system for the Lindenwold High-Speed Line.

CAR MAINTENANCE FACILITIES AND METHODS EXPERIENCE

The experience of Louis T. Klauder and Associates concerning rapid transit and railroad car maintenance is described below:

1976 - 1981	Federal Railroad Administration: As subcontractor to DeLeuw Cather/Parsons Associates, responsible for supervision of the design of maintenance facilities for the Northeast Corridor Railroad Improvement Program (Washington-New York-Boston), including heavy repair, running repair and inspection facilities.

1975 - 1976	Mass Transit Administration, Maryland Department of Transportation: For the Northern Central Corridor light rail transit (LRT) preliminary engineering study, analyzed car service and repair needs and defined facilities required to maintain the fleet size estimated. Klauder prepares shop design criteria for routine functions (scheduled servicing, inspection and minor repairs) and heavy repairs (vehicle overhaul, wheel truing, truck replacement, major component exchanges, major modifications, acceptance and preparation of new cars) as well as exterior car washing/interior cleaning. Shop spatial requirements were prepared, with space allocated to the following functions: vehicle heavy repairs; vehicle routine repairs and inspections; interior and exterior vehicle cleaning; vehicle painting; vehicle replacement parts and supplies storage; electrical and machine shops for component repairs; supervisory offices for the equipment maintenance, maintenance of way and transportation departments; and employee hygiene and locker facilities.
1974 - 1976	Companhia do Metropolitano de Sao Paulo, Brazil: Development of methods and preparation of procedures for maintenance of new rapid transit car fleet and supporting equipment.
1973 - 1974	Southeastern Pennsylvania Transportation Authority: Study and analysis of operating and maintenance facilities and practices now in use on two commuter railroad networks, two rapid transit lines, two light rail systems and trolley-bus lines serving southeastern Pennsylvania, in connection with preparation of a Master Plan for public transportation improvements in the region.
1973	National Railroad Passenger Corporation (Amtrak): Evaluation of locomotive maintenance procedures applied by Atchison, Topeka and Santa Fe Railway in repair and servicing of Amtrak power units.
1970 - 1971	San Francisco Municipal Railway Improvement Corporation: Defined requirements for a shop to maintain new light rail vehicles (LRVs). Objectives to be met by the new facility were developed, and were used to estimate space and equipment needs for the following functional areas: equipment storage and servicing; vehicle inspection; vehicle overhaul; general machine and coupler area; air brake, electronic, motor, and control maintenance areas; wheel, truck and gear unit maintenance areas; minor supporting shops; general supporting facilities and administration. Descriptions of functions and facilities in each shop sub-area were prepared (e.g., sheet metal area, pantograph area, welding/blacksmith area, etc.), as were a supporting site plan and floor plan. More detailed plan and sectional drawings were made to illustrate sub-area layouts and certain critical dimensions. This work became the basis for final shop design.

1968 - 1969	Metropolitan Transportation Authority of the State of New York: Development of preliminary plans for a new shop for inspection and maintenance of a fleet of new cars under construction for the Long Island Rail Road, including description of methods and procedures to be used in care of the new fleet.
1967 - 1968	Delaware River Port Authority of Pennsylvania and New Jersey: Arrangement and procurement of tools for a shop for inspection and maintenance of new rapid transit cars under construction for the new Lindenwold rapid transit line, including later development of methods and procedures for maintenance of the new car and an organization and staff for the shop.
1966 - 1967	New York City Transit Authority: Study of rolling stock maintenance policies and procedures, with recommendations for changes in methods and standards for equipment maintenance.

TRANSIT AND RAILROAD ELECTRIFICATION EXPERIENCE

The experience of Louis T. Klauder and Associates in electrification systems for railroad and rapid transit lines is described below. In addition to this body of work, many of Klauder's operations and planning studies have included examinations of electrification systems at the feasibility and preliminary engineering levels for railroad, rapid transit and light rail systems.

1978 - 1980	City of Calgary, Alberta: As subcontractor to Underwood McLellan (1977) Limited, follow-on power/electrical distribution system of light rail transit line project, including design, specification and procurement.
1978 -	Tri-County Metropolitan Transportation District (Portland, Oregon): In joint venture with Parsons Brinckerhoff, Phase I of the preliminary engineering study for a 14-mile light rail line planned for the Banfield corridor. Tasks include specific systems and interfaces/interactions of the overall system.
1977 - 1981	Federal Railroad Administration: As subcontractor to DeLeuw Cather/Parsons Associates, engineering services relating to the preparation of specifications for catenary inspection and maintenance vehicles.
1977	Federal Railroad Administration: As subcontractor to Electrak, Inc., assist in engineering appraisals of planned electrification system improvements for railroad lines in the Northeast Corridor.
1976 - 1977	City of Calgary, Alberta: As subcontractor to DeLeuw, Cather (Canada) Limited, preliminary engineering of traction power/electrical distribution system during feasibility study of proposed light rail transit line.

1973	Ministry of Roads and Transport, State of South Australia: Review of reports on commuter rail electrification prepared by officials of the South Australia Railway and recommendations regarding the relative advantages of alternating current and direct current supply of electrical power.
1972	Delaware River Port Authority of Pennsylvania and New Jersey: In association with Gannett Fleming-Bellante Clauss, preparation of plans and specifications, inspection and installation and testing of a new substation for the City of Philadelphia's Locust Street Subway, operated by the Port Authority Transit Corporation.
1972	Delaware River Port Authority of Pennsylvania and New Jersey: In association with Gannett Fleming-Bellante Clauss, estimates of cost for electrification in connection with preliminary feasibility studies of various extensions to the Port Authority Transit Corporation's rapid transit system serving southern New Jersey.
1967	Massachusetts Bay Transportation Authority: As subcontractor to Sverdrup & Parcel and Associates, Inc., preparation of preliminary design and estimates of costs for electrical propulsion power on the proposed extension of the Cambridge-Dorchester subway from Harvard Square to Alewife Brook.
1967	Southeastern Pennsylvania Transportation Authority: Analysis of the feasibility and cost of electrifying the Reading Company's Newtown branch between a proposed junction with the West Trenton line at Bethayres and Newtown.
1967	Southeastern Pennsylvania Transportation Authority: Analysis of the feasibility and cost of extending electrification on the Hatboro branch of the Reading Company from Hatboro to Johnsville.

TRANSIT AND RAILROAD SIGNAL SYSTEM EXPERIENCE

The experience of Louis T. Klauder and Associates in signal systems engineering for railroad, rapid transit and light rail lines is described below. In addition to these assignments, many of the firm's railroad and transit operations and planning studies have included examinations of signaling issues at the feasibility and preliminary engineering levels.

1978 - 1980	City of Calgary, Alberta: As subcontractors to Underwood, McLellan (1977) limited, follow-on engineering services for signal and communications systems of light rail transit line project, including design, specification and procurement.
1978 -	Tri-County Metropolitan Transportation District (Portland, Oregon): In joint venture with Parsons Brinckerhoff, Phase I of the preliminary engineering study for a 14-mile light rail line planned for the Banfield corridor. Tasks include specific systems and interfaces/interactions of the overall system.

1976 - 1977	City of Calgary, Alberta: As subcontractors to DeLeuw, Cather (Canada) Limited, preliminary engineering of signal and communications system during feasibility study of proposed light rail transit line.
1976	Massachusetts Bay Transportation Authority: As subcontractors to Sverdrup & Parcel and Associates, preliminary engineering for signals and communication on the Red Line Extension from Davis Square to Alewife Brook Parkway, including information collection, signal and communication analysis and preliminary engineering, cost estimates, review of special problems and project management.
1974	National Railroad Passenger Corporation (Amtrak): Technical engineering and inspection services with regard to cab signals, speed control and train stop on new diesel electric locomotives and present Metroliners.
1973 - 1979	San Francisco Municipal Railway Improvement Corporation: Field engineering services in connection with the installation of wayside and carborne signal and communications equipment for control of 100 new light rail cars.
1972 - 1974	Companhia do Metropolitano de Sao Paulo: Inspection and approval of all of the rapid transit car system signal control and telecommunications equipment being manufactured in the United States and Europe for use on the rapid transit system being built in Sao Paulo, Brazil. This included the development of all Maintenance Procedures Manuals.
1972	Delaware River Port Authority of Pennsylvania and New Jersey: In association with Gannett Fleming-Bellante Clauss, estimates of cost for signals and communications in connection with preliminary feasibility studies of extensions to the Port Authority Transit Corporation's rapid transit system serving southern New Jersey.
1972 - 1976	Commonwealth of Pennsylvania: As subcontractor to Ammann and Whitney, preparation of plans and specifications for the signal system of the Frankford Elevated rapid transit line in Philadelphia being relocated under a State Highway Department contract in connection with the construction I-95 (Delaware Expressway).
1971	San Francisco Municipal Railway Improvement Corporation: Design a new signal system for the control of "Muni Metro" light rail vehicles in the Twin Peaks Tunnel, Sunset Tunnel, and the new Market Street subway.

EXPERIENCE WITH TRANSIT VEHICLES EQUIPPED TO ACCOMMODATE ELDERLY AND HANDICAPPED PASSENGERS

1978	Southeastern Michigan Transportation Authority: Selected to provide Quality Assurance services for 189 Advance Design Transit Coaches (RTS-II) being manufactured by the General

	Motors Corporation, 57 of which will be equipped with wheelchair lifts.
1978	Washington Metropolitan Area Transit Authority. Selected to provide Quality Assurance services for 281 transit coaches being manufactured by the Flxible Company, 130 of which will be equipped with Vapor Corporation wheelchair lifts.
1977 - 1978	Port Authority of Allegheny County: As subcontractor to Parsons Brinckerhoff-Gibbs & Hill, evaluate vehicle alternatives, including determination of design modifications required to accommodate non-ambulatory handicapped passengers; estimate cost and prepare draft specifications and bidding documents for light rail vehicles required for Stage I of the Pittsburgh Light Rail Transit (LRT) Program.
1977	Michigan State Department of Highways and Transportation: Preliminary engineering investigation of the feasibility and cost of retrofitting commuter rail coaches of the Southeastern Michigan Transportation Authority to accommodate elderly and handicapped passengers.
1977 - 1978	Regional Transportation District in Colorado: Engineering and Quality Assurance services during the manufacture and installation of wheelchair lifts of 18 transit coaches being built by the Flxible Company.
1977 - 1978	San Mateo County Transit District: Engineering and Quality Assurance services during the manufacture by Transportation Design and Technology of wheelchair lifts to be installed in 24 transit coaches being built by AM General Corporation.
1976 - 1978	Southern California Rapid Transit District: Technical analysis and evaluation of wheelchair lifts being manufactured by Transportation Design and Technology for installation on 200 transit coaches being built by AM General Corporation.

EXPERIENCE IN TRANSIT PLANNING, OPERATIONS STUDIES AND ALTERNATIVES ANALYSES

Louis T. Klauder and Associates has conducted and participated on consultant teams engaged in urban and regional transit planning and operations studies. Our experience in this area is described below.

1977 - 1978	City and County of Honolulu, Hawaii: Assistance to the Director of Transportation Services concerning the Honolulu fixed guideway rapid transit system.
1977	City of Cincinnati, Ohio: Assist the Public Utilities Department with transportation planning and policy matters.
1977	Brisbane Metropolitan Transit Project Board, Queensland, Australia: As subcontractor to P.G. Pak-Poy and Associates, Pty., Ltd., assistance with the Brisbane-to-Gold Coast Corridor Transit Study.

1976	Florida Department of Transportation: As subcontractor to Harland Bartholomew and Associates, assistance in a study of commuter rail, rapid rail and light rail transit alternatives for improving public transportation between Miami and North Palm Beach as part of the Southeast Florida Transit Corridor Study.
1976	Murphy Engineering, Inc. (Chicago, Illinois): Supporting services for a study of public policy questions for the Regional Transit Authority of New Orleans, Louisiana.
1976	Southeastern Michigan Transportation Authority: Operations planning and other engineering services in connection with the evaluation of proposed commuter railroad service improvements for six transportation corridors serving Detroit and its suburbs.
1976	County of Los Angeles, California: Preliminary operations feasibility study of the proposed Sunset Coast Line rail rapid transit system.
1976	Trustees of the Penn Central Transportation Company: Assist in the identification of Penn Central branch lines that would have value as public transportation routes.
1975	Massachusetts Bay Transportation Authority: As subcontractor to Greiner Engineering Sciences, Inc., assist in the North Shore Transit Improvement Study, including operations analyses and costs and preliminary engineering for signals, communications and electrification.
1975	Southern California Association of Governments: Capital and operating cost information in correction with the Association's Investigation of alternative solutions to the Los Angeles transportation problems.
1975	Metropolitan Transportation Authority of the State of New York: As subcontractor to Wilbur Smith and Associates, provide technical assistance to Wilbur Smith and Associates in connection with its study of the bus and rapid transit operations of the New York City Transit Authority in the Bronx.
1975	Metropolitan Dade County Aviation Department: Serve as the transportation consultant in connection with the preparation of a master plan study for the Miami International Airport.
1974	Connecticut Department of Transportation: Feasibility and implementation study of alternative commuter rail or bus service improvements in the corridor between Hartford and Enfield, Connecticut.
1974	Mass Transit Administration of the Maryland Department of Transportation: As subcontractor for Dalton, Dalton, Little, Newport, assist with the Baltimore Northern Central Preliminary

Engineering Study, including the evaluation of vehicle options resulting in the selection of a light rail alternative, preparation of design criteria and definitive plans for train control and communications, analysis of security and surveillance requirements, noise and vibration problems, operating costs and train operations.

1974 Maryland Department of Transportation: As subcontractor for Dalton, Dalton, Little, Newport, assist with the Baltimore Phase II Rapid Transit Study in the area of modal technology, including analysis of existing and proposed modes and related capital, operating and maintenance costs.

1974 Alan M. Voorhees and Associates, Inc.: Estimates of rail rapid transit operating and maintenance costs for net income analysis of Washington Metropolitan Area Transit Authority regional system for the next thirty years.

1974 Southeastern Michigan Transportation Authority: Feasibility investigations of improved alternative bus or railroad commuter services between Detroit and Ann Arbor, Michigan.

1972 Philadelphia 1976 Bicentennial Corporation: Investigation of operating feasibility and costs for high-speed, high-volume railroad passenger service between 30th Street Station and a proposed international exposition site in southwestern Philadelphia.

1972 Delaware River Port Authority of Pennsylvania and New Jersey: In association with Gannett Fleming-Bellante-Clauss, estimation of operating requirements and costs pertaining to extension of the Port Authority Transit Corporation's rapid transit system serving southern New Jersey.

1972 Trustees of the Penn Central Transportation Company: Avoidable and full-cost studies of passenger service operations in the Philadelphia, Boston and northern New Jersey metropolitan regions.

1971 The Port of New York Authority: Study of an extension of the Port Authority Trans-Hudson (PATH) rapid transit line from Penn Station (Newark) to Newark International Airport, thence to Elizabeth and west to Cranford, New Jersey. The study, subsequently expanded to include extension west of Cranford to Plainfield, New Jersey, consisted of investigation of alternative routes, preliminary construction cost estimates of the recommended route, proposed operating schedules and the preparation of ridership estimates.

1971 Southeastern Michigan Transportation Authority: Preparation of a project definition report for the Woodward Avenue rapid transit line in Detroit, Michigan, including estimates of capital and operating costs for three levels of prospective patronage.

1971	Delaware Valley Regional Planning Commission: In association with Wilbur Smith and Associates, analysis of operating feasibility and costs of a series of commuter railroad and rail rapid transit improvements in the corridor between downtown Philadelphia and Media, Pennsylvania.
1970	San Francisco Municipal Railway Improvement Corporation: Assist with the study of the operations of existing light rail lines serving San Francisco and development of recommendations for line extensions and revisions, improved flexibility in operations, improved access to maintenance facilities and improved vehicle utilization.
1967	Southeastern Pennsylvania Transportation Authority: Avoidable cost study of the Pennsylvania Railroad commuter services in the Philadelphia metropolitan region.

TRANSIT SYSTEM MANAGEMENT EXPERIENCE

Prior to joining Louis T. Klauder and Associates, various key staff members developed extensive management experience in public agencies in line and staff roles: transit authorities, city and public urban managers, non-profit corporations, transportation planning groups, rolling stock maintenance activities and management information systems. Others have served in similar positions in private companies, both carriers and equipment manufacturers. In addition, the Klauder firm is the only consulting engineering firm located in the United States that has been responsible for the start-up and day-to-day operations of a new rail transit system. Between 1967 and 1971, Louis T. Klauder and Associates provided management services for the Delaware River Port Authority (DRPA) over a three and one-half year period. Louis T. Klauder and Associates set up procedures, established management information and control systems and performed other organizational and non-repetitive work in connection with the start-up of operations of the DRPA's 15-mile long suburban rapid transit line between Philadelphia, Pennsylvania and Lindenwold, New Jersey.

Services included provision of an experienced transportation executive employed by the Klauder firm to serve on a full-time basis as interim General Manager of the Port Authority Transit Corporation, the DRPA's transit personnel for the new organization.

Other services provided as part of this assignment included preparation of detailed operating procedures for all aspects of operation and maintenance of equipment and rights-of-way; preparation of job descriptions and establishing of prospects for employment and assistance in negotiating agreements with the respective labor organizations involved in the operation; preparation of detailed systems of operational and cost accounting records; recommendations for data processing reports and actions to be taken as a result of the reports, study of and recommendations concerning the advisability of installing incentive programs, both for the entire operation as well as for special programs in the area of equipment maintenance.

1971	Delaware Valley Regional Planning Commission: In association with Wilbur Smith and Associates, analysis of operating feasibility and costs of a series of commuter railroad and rail rapid transit improvements in the corridor between downtown Philadelphia and Media, Pennsylvania.
1970	San Francisco Municipal Railway Improvement Corporation: Assist with the study of the operations of existing light rail lines serving San Francisco and development of recommendations for line extensions and revisions, improved flexibility in operations, improved access to maintenance facilities and improved vehicle utilization.
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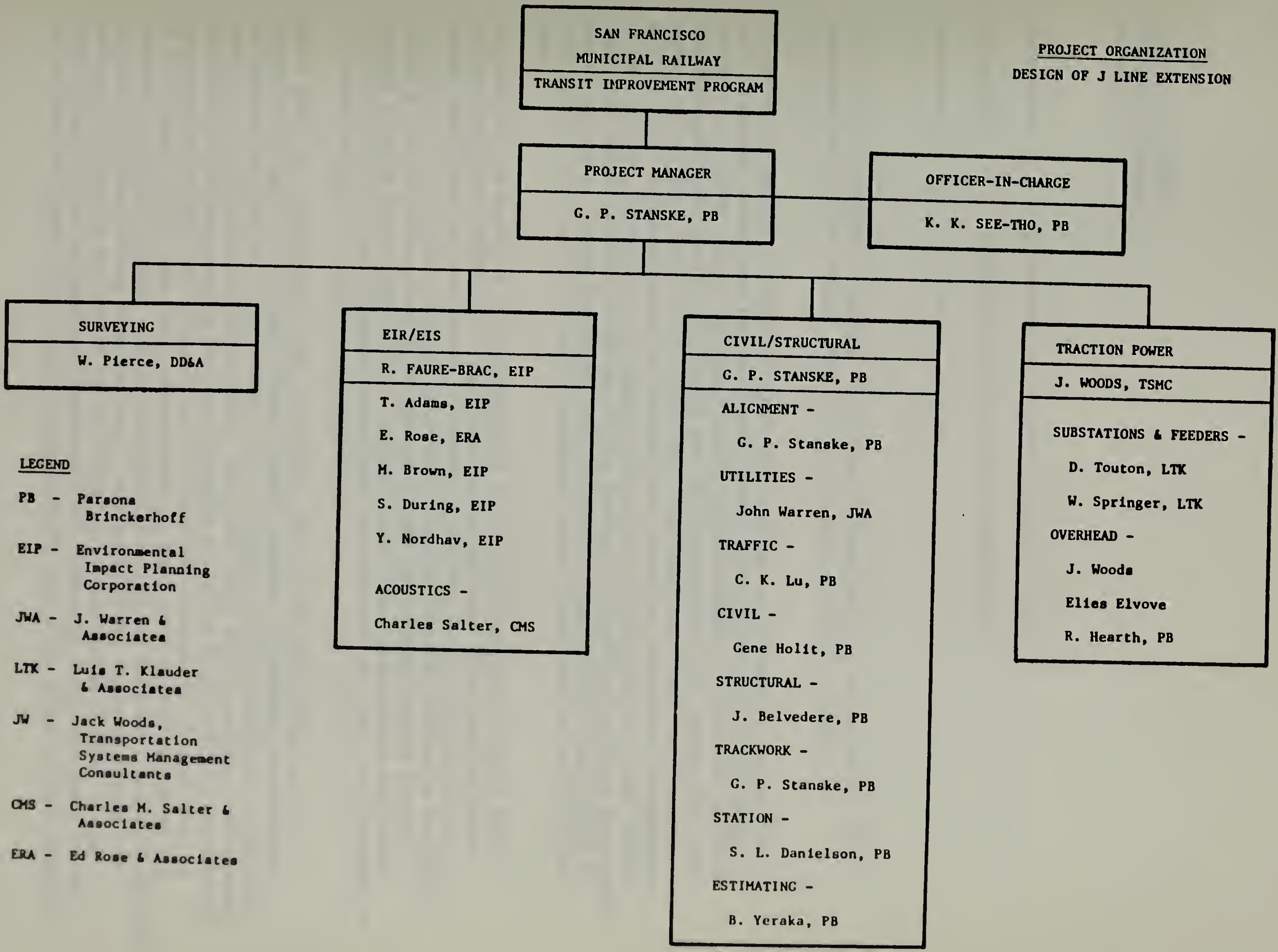
• Environmental Impact Planning Corporation	Environmental Impact Report and Statement Preparation
• E. M. Rose & Associates	Environmental Impact Report and Statement Preparation
• J. Warren & Associates	Utilities
• Charles M. Salter Associates	Noise
• DD & A Consultants	Surveying
• Louis T. Klauder and Associates	Advisor on evaluation of existing traction power system.
• Jack Woods	Traction power

We believe that we are presenting to MUNI one of the finest transit system engineering and design teams in the industry today. We are bringing this Team together from transit jobs around the country, selecting those engineers having recent and applicable light rail transit experience who can best serve the people of San Francisco in the J Line Extension Project.

PROJECT ORGANIZATION
DESIGN OF J LINE EXTENSION



LEGEND

PB - Parsons Brinckerhoff
EIP - Environmental Impact Planning Corporation
JWA - J. Warren & Associates
LTK - Luis T. Klauder & Associates
JW - Jack Woods, Transportation Systems Management Consultants
CMS - Charles M. Salter & Associates
ERA - Ed Rose & Associates

KOK KWAI SEE-THO
Officer-in-Charge
PBQ&D, INC.

Education: University of Arizona, B.S.C.E., 1963

Societies: American Society of Civil Engineers

Licenses: California, Georgia

Mr. See-Tho an owning principal of Parsons Brinckerhoff is an Assistant Vice President and Office Manager for the Western Region Activity Center in San Francisco.

He served as Project Engineer in both final design and construction services for the Church Street and Castro Street Subway Stations and their contiguous subway line structures in the Outer Market Street segment. These two stations are designed specifically for Muni's new LRV operations. The design and construction of these two stations and their line structures involved the consideration of rerouting existing automobiles, buses and streetcars; maintenance of all traffic, especially the transit operations through the Twin Peak Tunnel, requiring the renovation of Eureka Valley Station to permit shooflying and single-track operations. That assignment had afforded Mr. See-Tho the opportunity to work closely with many City staff personnel, some of whom are new with TIP and Muni.

Mr. See-Tho has been the liaison engineer for all Metropolitan Atlanta Rapid Transit Authority (MARTA) work performed in the office. This work includes design development of the subway segments in downtown Atlanta, final design of a portion of Five Points Station (the major transfer subway station in the MARTA system), the preliminary and final design of the Cain Street Subway Station, designs of work shop expansions and carwash facilities, preparation and review of the Civil/Structural Criteria subway and appurtenance sections, and preparation of subway structural standards and manuals.

Since 1964, Mr. See-Tho has been intimately involved in the design and construction of the Bay Area Rapid Transit (BART) system. He served as structural job engineer on the BART Upper Market Street segment in San Francisco, involving problems of underground construction in very soft clay soil materials. Structural and construction engineering problems included a pair of bored tunnels constructed under high compressed air pressure and cut-and-cover structure 55 feet wide by 65 feet deep by 1100 feet long, constructed inside a tremie concrete in slurry trenches cofferdam system. Design consideration included buoyancy, possible flooding and loss of ground during construction. Responsibilities included layout and design of facilities and review of the contractor's cofferdam bracing system. These works include the approach tunnels to the Trans-Bay Tube, the Spear Street Shafts, and the Embarcadero Station, particularly the first phase of that station.

KOK KWAI SEE-THO

Other significant experience in the BART development includes: plaza entrances in San Francisco and downtown Oakland; and protection system for Trans-Bay Tube on Oakland side of the Bay; design of subway stations and line structures in downtown Oakland, Powell Street and Montgomery Street Stations and shield driven tunnels in downtown San Francisco, was engineer-in-charge of the design and construction services for the San Francisco Ferry Building Plaza Platform supported by some 1,000 prestressed concrete piles, formulation of geotechnical programs for the Outer Market Street Subway, as well as for the Plaza platform and the Embarcadero Station, formulation of instrumentation programs for subway construction in Oakland and San Francisco, and underpinning of buildings.

Other transit or transportation related projects that Mr. See-Tho has experience in includes railroad ventilation structures for the 7-mile Flathead Tunnel in Montana, ventilation shafts for the WMATA system, transit studies for the Fort Worth-Dallas region, in recent years the underground railway line and station designs for Taiwan, and the assessment of a geotechnical program for the proposed subway mass transit project in Singapore.

Besides the MARTA work, Mr. See-Tho's other recent assignment is that of Project Design Manager for the Positron-Electron Project, a high energy physics research facility located in the hills of Stanford Linear Accelerator Center.

GEORGE P. STANSKE
Project Manager
PBQ&D, INC.

Education:	B.S.C.E., New York University M.S.C.E., Brooklyn Polytechnic Institute Certificate G.B.A., University of California
Societies:	American Society of Civl Engineers American Railroad Engineers Association
Licenses:	New York, Michigan, California and Georgia

Mr. Stanske has over 20 years of professional engineering experience in various facets of civil engineering with special emphasis in the field of transportation. He is presently Deputy Project Manager for the Portland Light Rail Transit Project. This work includes engineering design of route, station zones, and support facilities, as well as environmental evaluations and establishment of public participation programs. He has also served as Project Manager on the 20-mile long Metro in Caracas, Venezuela, where he was responsible for the construction of a yard and the system trackwork.

As principal civil engineer on the Taipei City railway relocation project in Taiwan, Mr. Stanske evaluated technical feasibility of placing the city's railroad and terminal complex underground. Responsibilities included review of existing conditions; development of criteria and plans for the relocation of streets, utilities sewers, storm drainage, and railroad facilities, review of existing railway improvement programs; development of railway operating plans, and development of alternative construction schemes for the project.

When assigned to the Joint Venture of Parsons Brinckerhoff-Tudor-Bechtel Mr. Stanske was in charge of all civil engineering design performed by PBTB for the San Francisco Bay Area Rapid Transit District. This work included overall charge of the track design, utility engineering and right-of-way engineering for the project. In addition to the civil engineering aspects of the project, he was assigned to the consultants' transit committee, setting operating policies for the design of the system.

Mr. Stanske has prepared designs and acted as consultant on civil engineering and construction matters for the Metropolitan Atlanta Rapid Transit Authority, the Caracas Metro, the Sao Paulo Metro in Brazil, the Massachusetts Bay Transit Authority and the San Francisco Municipal Railway.

GEORGE P. STANSKE

Mr. Stanske's engineering background includes design of items of fixed railroad plant, such as branch lines, yard freight unloading facilities, industrial spurs, bridges, temporary tracks and structures for relocation use during construction projects and industrial buildings; and preparation in various transportation studies, such as a national study in Ecuador, and the merger of New York Central and Pennsylvania Railroads. Before joining the firm, he worked with New York Central Railroad in maintenance work and new construction; with the New York State Department of Public Works as Transportation Analyst; and with the U. S. Army Corps of Engineers in the study of civil works projects and construction of harbor facilities.

TED ADAMS
Landscape Architect
Environmental Impact Planning Corporation

Education:	B.L.A. in Landscape Architecture, University of California Berkeley, 1966.
Societies:	Member, American Society of Landscape Architects Member, Association of Environmental Professionals
Licenses:	Landscape Architect in California

1977 to present: Environmental Impact Planning Corporation, Senior Associate. Serves as project manager for EIP's reports with special emphasis in the fields of land use, resource management, environmental urban design, visual analysis, and detailed site design. Develops methods of planning, impact assessment, and mitigation through environmental data overlay analysis, photo interpretation, graphic methods, and others to suit specific project requirements. Project manager for Levis Plaza (Corporate Headquarters), medical office and warehousing complexes, office buildings and industrial and residential subdivision projects throughout the San Francisco Bay area. Supervises EIP's graphics studio responsible for preparing the many illustrations and layouts required for EIP's reports.

1969-1976: EDAW, Inc. Senior Associate since 1973, Associate since 1969, and Director of Operations, Minneapolis Office, 1974-1976. Directed management and supervision of firm's projects, including environmental analyses, planning, and design. Projects included the 6,000 square mile U. S. Navy Project Seafarer; graphic environmental analysis and recording procedures for the landmark Minnesota Power Plant Siting Study; the land use master plan for 3M world headquarters complex; electric transmission line routing studies; a national gas pipeline environmental impact statement and state-of-the-are survey for the Federal Power Commission.

1966 to 1969: Eckbo, Dean, Austin & Williams, Project Manager, Project Director.

1963, 1964, and 1965: U. S. Department of the Interior, National Park Service, Assistant Landscape Architect responsible for National Park System land use master planning and design.

JOHN A. BELVEDERE
Structural Engineer
PBQ&D, INC.

Education:	B.S.C.E., University of Michigan, 1962
Societies:	American Society of Civil Engineers Project Management Institute SEAONC
Licenses:	California, Georgia

Mr. Belvedere has more than 15 years experience in the planning and design of public works, with special expertise in the design of transit facilities and all phases of bridge planning, design and construction.

He is currently assisting in the development of the feasibility study for the Portland Light Rail Transit Project, and is evaluating bridge capacities, alternative configurations, and required structural reconstruction.

Mr. Belvedere is also a Structural Engineer for the Southwest Ocean Outfall Project for the City and County of San Francisco Wastewater Management Plan. The scope of work for this project encompasses data review; oceanographic, geologic, and seismic field work and studies; conceptual planning and preliminary and final design for the Outfall project.

Since joining Parsons Brinckerhoff, he has served as project engineer for the design of the Five Points Rapid Transit Station of the Metropolitan Atlanta Rapid Transit Authority (MARTA) system, with responsibilities for the design of subway structures, cofferdam walls and underpinning of buildings, as well as preliminary design for the roof structure of the station.

Previously, Mr. Belvedere was employed as a Bridge Project Design Engineer for the California Division of Highways, where he was responsible for coordinating site investigations, bridge type selection, and design specifications and estimates for various highway and railroad bridge projects. Major projects involving the design of timber and steel, conventionally reinforced and prestressed concrete bridges included the Mission Valley Viaduct in San Diego, which won the Prestressed Concrete Institute's award; a high-level crossing for the North Fork of the Mud River near Eureka, California; and several concrete bridges for the both high- and low-level highway interchanges.

Mr. Belvedere was a member of the California San Fernando Earthquake Investigation Team that inspected bridge damage resulting from that earthquake, and later co-authored "The San Fernando Earthquake - Field Investigation of Bridge Damage", which provided the basis for design changes in California's highway bridges.

BURTON N. CROWELL
Civil Engineer
J. Warren & Associates

Education:	M.S. Civil Engineering, University of California, Berkeley B.S. Civil Engineering, University of California, Berkeley
Societies:	American Society of Civil Engineers American Public Works Association Professional Engineers in California Government (a founder and past president)
Licenses:	California - Civil Engineer

Mr. Crowell's general abilities include all phases of physical planning and development and heavy construction as they relate to transportation systems in the physical and political environment. He has also developed abilities in contract negotiation and management; project management, organizational development and budgeting; the selling and marketing of proposals to both public and private entities; also planning of staff training programs.

Mr. Crowell spent 25 years in the planning, design and construction of urban freeways with the California Division of Highways (now CALTRANS). Specific projects include: direction of planning studies for the Panhandle Parkway and Golden Gate Freeway in San Francisco; technical advisor on transport planning to Bay Area cities and counties as well as the Metropolitan Transportation Commission for the development of comprehensive transportation planning and financial programs; design of the easterly approach to the San Francisco-Oakland Bay Bridge and part of the MacArthur Freeway in Oakland, California; and as the Construction Engineer for the joint freeway-rail rapid transit corridor for the Bay Area Rapid Transit District and the California Division of Highways in Alameda and Contra Costa Counties, also numerous projects in San Mateo and Santa Clara Counties.

For six years, Mr. Crowell was Assistant Director of the Metropolitan Commission in the San Francisco Bay Area. His duties dealt with all aspects of planning, finance and programming, transportation forecasting and data management. For over a year, he was project director for the BART Impact Program, a federally sponsored effort to evaluate the overall effect of BART. Projects under his direction included a number of multi-agency and "high-occupancy-vehicle" proposals to accommodate all modes of travel in light of the nation's current environmental and energy concerns. He was a director and technical coordinator for the RIDES carpooling program. For a short time, he served as director of MTC's airport and seaport planning efforts.

BURTON N. CROWELL

Over the past 15 years, Mr. Crowell has consulted on transportation projects in San Jose, California; New York City; Akron, Ohio; Washington, D.C.; Fort Worth, Texas; and Duluth, Minnesota.

In 1966, he was appointed a lecturer for a series of seminars for U.C. Extension, sponsored by the Institute for Transportation Studies (then I.T.T.E) and Department of Landscape Architecture, titled, "The Complete Highway", which dealt with current social, economic and political problems facing engineers. He has appeared before graduate seminars in transportation at Stanford, U.C. Berkeley, and San Jose State Universities.

Mr. Crowell is principal author of two reports: "The Panhandle Parkway" and "Pacific Heights Tunnel and the Golden Gate Freeway", published in 1964 and 1965, respectively, by the California Division of Highways. These reports are unique in that the work it chronicles is the basis for the approach now being taken to design public works throughout the country.

In 1966, Mr. Crowell acted as advisor to Mr. Lawrence Halprin on the technical aspects of his book, "Freeways".

SCOTT L. DANIELSON
Project Architect
PBQ&D, Inc.

Education:	Stanford University, B.S. 1961 Massachusetts Institute of Technology, B. Arch., 1962 M. Arch., 1967
Societies:	American Institute of Architects Tau Beta Pi

Mr. Danielson is a senior architect with PBQ&D. He has had more than 15 years of experience in building projects from banks to airport industrial facilities and construction types from low-cost, tilt-up industrial construction to pre-stressed, post-tensioned prefabricated concrete. His current project is the 22,000 sq. ft. Sun House Museum and cultural center for private clients in Ukiah, California.

Mr. Danielson is providing special design assistance for a 250 bus maintenance facility in Santa Clara, California. He was Project Architect on a $5 million Training Facility for General Electric in San Jose, California. This is an industrial-type structure featuring high-bay structures and a low classroom/office wing. By working closely with siding system that reduces materials, eases erection and gives a striking facade design at a highly competitive price (discussions and estimates by a pre-engineered structures contractor showed no significant savings and lack of flexibility in the resulting structural frame.)

Mr. Danielson was the project architect for the $78 million Positron-Electron Project at Stanford University, and was responsible for modifying the site layout and architectural design of this high-energy physics research facility so that it met the researchers' needs in a more efficient and economic way and at the same time fulfilled the strict aesthetic and environmental standards of Stanford University and the surrounding residential neighborhoods.

Mr. Danielson was responsible for the design of the vehicle maintenance and wash facilities for the Metropolitan Atlanta Rapid Transit Authority (MARTA) in Atlanta, adding facilities which had not been requested and included in early planning and therefore having to arrange them on an extremely confined site while meeting normal functional criteria. He was also the architect and urban designer for the Fullerton Transportation Study in Fullerton, California. This involved developing an urban design and architectural concept for a transportation center that would integrate an existing Santa Fe/AMTRAK facility, an unused Union Pacific Station of historic value, a projected bus facility for OCTD service, an urban plaza, new commercial office structures and required parking. He is currently the architect and urban designer on a Transportation Center Study for Huntington Beach which is to develop a bus center to include Greyhound and Continental Trailways facilities as well as OCTD and RTD service and support commercial activities plus explore it as a possible catalyst for revitalizing downtown Huntington Beach.

SCOTT L. DANIELSON

He is Parsons Brinckerhoff's special consultant on transportation terminals design and architecture, giving special attention to management of space and interface between people and various modes of transportation that serve those people, and to functional and spatial requirements between the many modes of transportation that come together in modern terminal complexes .

Mr. Danielson was special consultant in development of an advanced concept for airport terminal planning and design, including presentation material to demonstrate the concept application and flexibility in meeting needs of eight major airports throughout the world. The concept integrates people mover systems, bus and automobile circulation, cargo and maintenance vehicles, and aircraft and their ground support vehicles.

He worked on the Bay Area Rapid Transit (BART) study of integration and impact of rapid transit rights-of-way, stations, and yards on surrounding communities in San Mateo County, including presentation material showing potential of transit facilities to achieve and enhance community design values.

Mr. Danielson was Project Architect for the Wasatch Canyons Transportation Study. He studied the aggregate costs and impacts of the particular conditions of Canyon travel in order to develop a set of implementable transportation management programs to accommodate dramatic tourist expansion in the impacted area. One of the his primary recommendations was the development of a multimodal transportation center to accommodate auto-to-bus transfers for Canyon access. He developed several alternative designs for implementation of this multimodal facility.

He served as project architect for San Francisco Airport Architects in joint venture study with the BART District and San Francisco and San Mateo Counties evaluating alternatives for rapid transit access to San Francisco International Airport, including integration of transit system within terminal system and within surrounding community. Also studied people mover systems and rapid transit access coordination for the San Francisco International Airport.

He served as senior designer for another firm on the Phoenix International Airport Master Plan integrating automobile, bus, parking, and people mover systems within the design; special consultant to Stanford Research Institute on Federal research project on urban impact of future transit system; special consultant to Massachussetts Institute of Technology study for the State of Massachusetts for presentation material of recreational and urban uses of harbor islands in Massachusetts Bay; and research assistant to MIT on urban impact of a dual mode vehicle system.

Mr. Danielson has been project architect or project designer for commercial buildings, hotels, large housing projects, recreational developments, and an industrial park. He served in a construction division while on active duty in the Air Force, and was involved in review of construction documents and supervision of construction of base facilities from maintenance hangers to base housing. He received the Air Force Commendation Medal for outstanding performance while inspecting construction of mass produced housing units in 1964.

SCOTT L. DANIELSON

Senior Designer for S. F. Airport Architects developed architectural design of the North Terminal, the elevated roadway and the central garage expansion. In that capacity, he worked closely with the staff of T. Y. Lin International in developing a marriage of architecture and structures.

Project Designer of the Bank of America Building in Agana Guam. This structure included a garage for 120 cars which had to accommodate not only a security/fare system, but also a separate right-of-way for 2 drive-up tellers.

ELIES ELVOVE
Electrical Engineer
PBQ&D, INC.

Education:	B.S., University of Maryland, 1939 M.S., University of Illinois, 1940 University of Pittsburgh, Post-Graduate Studies Columbia University, Post-Graduate Studies
Societies:	Institute of Electrical and Electronics Engineers New York State Society of Professional Engineers
Licenses:	New York, California, New Jersey, Wisconsin (PE)

Mr. Elvove has served as project manager and/or special advisor on numerous major electrical and mechanical projects, especially in the transportation, industrial, and commercial fields. His work has included mechanical and electrical design, as well as specifications and construction supervision, on rapid transit stations, yards, and shops; power plants; chemical process plants; laboratories; warehouses; shopping centers; and institutional buildings. His responsibilities have included electric power generation, distribution, and utilization; lighting; control; communications; process instrumentation, plumbing; heating; ventilation; and air conditioning. Recent relevant projects include:

- Baltimore Rapid Transit System. Project engineer for electrical and mechanical design for Lexington Market Station, combining a three-level station, three-story office building, and twin-tube line section, and including 13.2 kV service and switchgear, two 2,000 kVA 13.2 KV/277/480-volt substations, complete power distribution, lighting, control, communications, and closed-circuit television systems.

- Washington Metropolitan Area Transit Authority. Project engineer for electrical and mechanical design of Waterfront Station and twin-tube line section, including power, control, lighting, communications, and closed-circuit television.

- Metropolitan Atlanta Rapid Transit Authority. Design of local and remote supervisory control of station and line section equipment and fire detection systems.

- Massachusetts Bay Transportation Authority, Boston. Design of complete mechanical and electrical systems for the yard and maintenance center. Project included rectifier substation with two 3,000 kVA rectifiers, 1.38 kV distribution sytem, secondary distribution, control, signals, lighting, heating, ventilation, air conditioning, and plumbing systems.

RUSSELL V. FAURE-BRAC
Lead Environmental Analysis
Environmental Impact Corporation

Education:	B. S., Industrial Engineering, Stanford University, 1966 M. S., Engineering-Economic Planning, Stanford University, 1968.
Societies:	Association of Environmental Professionals, Vice President Bay Chapter

1972 to present: Environmental Impact Planning Corporation. As President of EIP, Mr. Faure-Brac supervises all work conducted by the firm. Mr. Faure-Brac is an environmental planner and a systems engineer with over 14 years of experience in environmental planning, engineering economics and waste management systems. He has had broad experience directing the technical aspects of environmental evaluations, dealing with citizens and public officials and presenting written and graphic materials in a form easily understandable to laymen and decision makers. Mr. Faure-Brac has been project leader for a number of major environmental impact studies, including the EPA-sponsored Bay Area Solid Waste Management Implementation project, the proposed U.S. 395 freeway in Reno, the Palo Alto Baylands Master Plan, and the Hillsdale Shopping Center Expansion. Each project required supervision of a large multi-disciplinary research team and sensitive interaction with community groups.

1970-1972: Whole Systems, Inc., Environmental Planner. Studied waste reclamation systems, including design of a source-separated solid waste collection system, and studies of algae ponding, spray irrigation, and composting of sewage sludge.

1970: Safeway Stores, Inc., Research Engineer. Conducted economic studies of computerized inventory management systems.

1969: Vista, Volunteer. Extended poverty programs to disadvantaged youth in rural Missouri.

1965-1968: Stanford Research Institute, Research Analyst. Conducted cost and systems analysis of communication satellite and other aerospace systems. Studies involved cos-benefit analysis, operations research, planning and budgeting, and computer modeling and simulation.

RICHARD L. HEARTH
Electrical Engineer
PBQ&D, Inc.

Education: University of California, Berkeley, B.S.E.E., 1960
California State University, Sacramento, M.S.E.E., 1977

Societies: Institute of Electrical and Electronic Engineers, Chairman Sacramento Section
Power Engineering Society, Past Chairman Sacramento Section

Licenses: California, Electrical Engineering
Control System Engineering

Mr. Hearth has over nineteen years of professional engineering and management experience in the planning, design, construction supervision and program management of power system study and design projects. Such projects have included transmission lines, substations, power plants, pumping plants and computer control systems.

Prior to joining Parsons Brinckerhoff he served as the deputy director of engineering of a consulting firm engaged in negotiating contracts for clients, evaluating tenders, and representing clients in technical and contractual discussions. As program manager he was solely responsible for the successful design construction of 70 million dollars in construction of transmission lines and substations.

Performed power system studies such as load flow, short circuit, transient analysis, protective relaying, motor starting and control and computer control. Performed complete designs of substations, switchyards to 230 kV, power plants, pumping plants and operation and maintenance centers.

Representative Projects:

- A. D. Edmonston Pumping Plan. In charge of the total electrical engineering of two major pumping plants with one being the 1,120,000 HP A.D. Edmonston Pumping Plant. In charge of the total control system engineering of three computer control systems.

- North Canal Hydroelectric Station, Lawrence, Massachusetts-responsible for the supervision of electrical design and studies for this 1,000 kW generating plant.

- OSCO Housing Substation, Ahwaz, Iran - program director for this 132 kV, 54 MVA distribution substation.

Richard L. Hearth

- Power System Expansion Program, Ahwaz, Iran - program manager for the design, construction supervision and contract administration of this project which included five 230 kV substations; 13, 132 kV distribution substations; and 320 km of 230 kV and 132 kV transmission lines.

- Pearblossom Pumping Plant, Pearblossom, California - senior electrical engineer in charge of design and constract administration for four 22,000 HP pumping units; two 11,000 HP pumping units; 230 kV switchyard; and a computer control system.

- California Aqueduct, Tracy, California to Los Angeles, California - senior electrical engineer responsible for design of radial gate control and power systems.

- Oroville Dam and Powerhouse, Oroville, California - assistant electrical engineer responsible for the design of dam instrumentation, tunnel lighting, switchyard and transmission line.

- Thermalito Powerplant, Oroville, California - assistant electrical engineer responsible for the design of auxiliary systems.

G. EUGENE HOLIT
Civil Engineer
PBQ&D, INC.

Education:	B.S.C.E., University of Washington, 1956
Socities:	American Society of Civil Engineers
Licenses:	California, Washington, Georgia

Mr. Holit has 20 years of experience in all phases of transportation and civil engineering and project management. Since joining Parsons Brinckerhoff in 1963, has been involved in major transit and transportation planning and design programs in San Francisco, Atlanta, Brazil, Los Angeles, Dallas-Ft. Worth and Kansas City. Has also been Deputy Chief Civil Engineer for PBQ&D, Inc. Recently served as project engineer for overall civil, structural, electrical, and mechanical design of a 0.7 mile, $30 million segment of downtown Atlanta subway of the Metropolitan Atlanta Rapid Transit Authority (MARTA) system.

For the Bay Area Rapid Transit (BART) program, was lead design engineer and program coordinator for civil and utilities design services for BART and MUNI light rail vehicle construction on Market Street in San Francisco, responsible for coordinating utilities design by outside agencies for various BART station contracts. Also served as lead civil design engineer for subway and surface light rail trackage and city streets, and as project engineer for civil engineering design of the station site, trackway and track alignment at Daly City Station, the southern terminus of the San Francisco branch of the system. Was also project engineer for five years in charge of route location, preliminary and final civil design, and preparation of contract documents for the Outer Mission line of the BART system.

Previously was in charge of route location planning and engineering for approximately 90 miles of light rail transit and bus transit lines within the metropolitan region of Kansas City, Missouri. Responsibilities included system geometric criteria, route alignments, typical sections, cost estimating and documentation.

CHYI KANG (TOM) LU
Traffic Engineer
PBQ&D, INC.

Education:	B.S.C.E., National Taiwan University, 1960 M.S.C.E., University of California, Institute of Transportation Ph.D., University of California, 1974
Societies:	American Society of Civil Engineers (Member) ITE (Member Transportation Research Board
Licenses:	Civil Engineer/Traffic Engineer-California

Dr. Lu has over 16 years' experience in all aspects of Transportation Planning. He has participated as Transportation Engineer in comprehensive transportation planning for Kansas City Metropolitan Region, Houston-Galveston Metropolitan Area, and Vancouver Metropolitan Area in British Columbia, involving land use evaluation, travel demand forecasting, research and development of modal split modeling, transit linknode network development, traffic distribution and assignments, data processing (application of HUD and UMTA Urban Transportation Planning System computer programs), road network adequacy analysis, planning and operations of bus and fixed guideway transit systems, parking and CBD traffic operations studies. Has extensive experience in transportation model development and applications, including direct operational knowledge of UTPS.

His experience with demand estimation and system operations of Light Rail is current and comprehensive. He was responsible for the patronage and system planning for the San Diego Light Rail concept which has resulted in the Transit Board negotiating with the railroad for acquisition of right-of-way; the Kansas City Light Rail segment of their transportation plan; the patronage estimation and system evaluation for light rail in Aspen, and will be advising on the demand forecasting aspects of our current regional transportation programs in Seattle, Washington; Orange County, California; and for our rehabilitation at the Transbay Terminal including Light Rail, in San Francisco.

At the University of California, Berkeley, in the Operations Research Center, was Research Assistant engaged in systems analysis and computer simulation of freeway traffic operations and improvements, and the planning of freeway emergency service systems. In the Institute of Transportation and Traffic Engineering, made individual traffic surveys and prepared data analyses for the San Francisco Bay Area Transportation Study.

WILEY J. PIERCE, JR.

Surveying
DD & A Consultants

Education:	Engineering Technology, Contra Costa College Richmond, California Engineering, Surveying and Business Administration, University of California Extension, Berkeley and San Francisco, California
Societies:	American Congress on Surveying and Mapping Califronia Society of Professional Engineers California Land Surveyors' Association Bay Counties Civil Enginers and Land Surveyors' Association
Licenses:	Registered Land Surveyor, State of California

DD&A Consultants, Inc., San Francisco (Present): Principal in the fimr of DD&A Consultants, Inc., to provide field engineering, land surveying and other technical services in conjunction with community development planning presently being provided by parent firm of Dukes-Dukes and Associates, Inc.

San Francisco Housing Authority (1976): Director, Program Development responsible for overall planning and direction of Program Planning, Project Development (modernization and new construction), and the Leased Housing Departments.

HUB City Urban Developers, Inc. (formerly New Compton Community Development Corporation), Compton, California (1975-1976): Executive Director responsible for overall planning and directing of NCCDC programs. Projects included a 65-acre auto center, a 63-acre residential project and a 100-acre Central Business District project. Assisted the City of Compton to amend the boundaries of a 50-acre redevelopment project to encompass approximately 900 acres; this resulted in the City successfully floating a $10 million tax increment bond issue.

Genge Community Consultants, Los Angeles, California (1972-1975): Vice President Community Development responsible for consultant services on community development and redevelopment projects in San Francisco, Oakland, Sacramento, San Diego and Compton, California. Services included urban planning, civil and municipal engineering, environmental impact reports, economic, financial and marketing studies, land surveying and architecture and preparation of redevelopment plans.

Pierce, Ramey and Associates, Inc. (1971-1972): President and Principal-in-Charge Co-founder of this firm, a subsidiary of the Murray-McCormick Environmental Group. Provided total engineering, architectural, planning and land surveying services.

Self-Employed: Berkeley and Oakland, California (1966-1971): Licensed Land Surveyor - conducted control, cadastral or boundary, construction, topographic, hydrographic surveys and related field engineering throughout the Bay Area. Some specific projects were: private residential subdivision in Contra Costa County: Acorn, City Center and Oak Center Redevelopment Projects, Oakland; India Basin, Hunters Point and Western Addition Redevelopment Projects, San Francisco; and 7th Street construction and reconstruction Container Cargo Port, Oakland.

EDWARD M. ROSE
Environmental Planner
E. M. Rose & Associates

Education: B. Arch., University of Washington
MUP, University of Washington

Societies: American Planning Association
American Institute of Architects
National Organization of Minority Architects

Mr. Rose provides a wide range of multidisciplinary services in urban planning, transportation planning, architecture and environmental impact analysis and assessment. He has experience in conceptual design, environmental impacts, citizen participation and safety and security for light rail systems.

Mr. Rose has had extensive transit and environmental experience with Parsons Brinckerhoff as part of the joint venture, Parsons Brinckerhoff/ Tudor, as Project Manager for the multidiscipline design team on segments of the Metropolitan Atlanta Rapid Transit Authority (MARTA) stations. His recent environmental responsibilities include environmental analysis and assessment of impacts on the MARTA system. Selected environmental studies which Mr. Rose has managed and had substantive involvement on the MARTA project include:

- Supplement One to the Final Environmental Impact Statement MARTA
- Supplement Two to the Final Environmental Impact Statement MARTA
- MARTA Environmental Criteria and Standards (a five-volume report)
- Environmental Considerations Report for 27 Stations and 17 Line Segments on the MARTA System

Additionally, Mr. Rose was extensively involved in the preparation of MARTA Station Area Land Use Planning Profiles and participated in the development of station area land development studies sponsored by the local government. Activities included assessment of environmental issues, land use and development pressures, problems and opportunities. Also developed and recommended planning policies to guide and encourage urban and regional development stemming from the construction of a transit system.

Other responsibilities on the MARTA project included monitoring and updating Manual of Architectural Design Criteria for design of stations, monitoring conformance to environmental commitments and historical preservation statutes during the construction stages of the MARTA project, and coordinating agreements between MARTA and public/private agencies whose facilities were impacted by MARTA construction.

EDWARD M. ROSE

For the Pittsburgh Light Rail Transit project, Mr. Rose was responsible for developing the system safety and security criteria, providing safety input to the overall design effort and providing support to the development of the Pittsburgh LRT Environemntal Impact Statement and community participation program. He has been involved in the Stanford Solid Waste Energy Project. In this assignment, Mr. Rose completed an assessment of the environmental and institutional requirements which the proposed project must comply with. This effort included a complete review of California Environmental Quality Act (CEQA) and the National Environmental Policy Act guidelines as they apply to resource recovery and other development projects in California.

Prior to joining the firm, he was project director/planner on various projects including the Seattle Metro Rapid Transit Study and the R.H. Thompson Expressway Project. Responsibilities on the Metro Transit Project include long and short-range alternative alignments, facility location, joint development and impact studies of proposed bus and rail rapid transit system for five Seattle neighborhoods, including the Model City Area. Responsibilities on the R.H. Thompson Expressway Project include interface with proposed rapid transit facilities, joint development and form and image studies in corridor and contiguous areas, and development of innovative methodologies for citizen involvement in the planning and design process.

Teaching Experience: Co-lectured Urban Planning Survey Seminar (HUD 701 Work/Study), University of Washington, September, 1971 to January, 1973.

Awards include: The Chestly Issac Memorial Fellowship and a Mellon Fellowship from the University of Washington; Marble Institute of America Design Award; Ocular Products Design Competition Winner.

CHARLES M. SALTER
Noise Consultant
Charles M. Salter Associates, Inc.

Education:	B.S.C.E., Tufts University, Structural Engineering, 1965. B.S. Art & Design, Massachusetts Institute of Technology, 1969, Architecture and City Planning M.B.A., Boston College, 1972, Finance
Societies:	Member, Acoustical Soceity of America Associate Member, American Institute of Architects Member, Association of Environmental Professionals Acoustical Society of America Member, California Society of Professional Engineers Member, Consulting Engineers Association of California Member, Institute of Noise Control Engineering Member, National Council of Acoustical Consultants
Licenses:	California, M.E. Nevada, M.E.

In the last ten years Mr. Salter has been Project Supervisor of a wide range of consulting work in the areas of architectural acoustics, noise control engineering, and environmental noise impact. Accomplishments have included room acoustics and aircraft noise isolation design for new University of Massachusetts campus and the new Riyadh International Airport, highway noise studies in none states and numerous power plant community noise impact surveys. He has had major involvement or project responsibility for assignments for schools, hospitals, office buildings, churches, theaters, highways, power plants, including projects at U. C. Medical Center (San Francisco), U. C. Santa Barbara Student Center, Yerba Buena housing and Stanford University.

Mr. Salter's past experience includes: Architectural and Engineering Draftsman and Designer (part-time) 1959-1968; Acoustical Consultant with Bolt Beranek and Newman, Inc., Cambridge, Massachusetts 1968-1972; Manager, Acoustical Engineering Division with Buonaccorsi and Associates, San Francisco, California, 1972-1975; Charles M. Salter Associates, Inc., Consultants in Acoustics, 1975 to present; and Lecturer in Acoustics, University of California, Berkeley, 1973 to 1978.

BIRGER SCHMIDT
Geotechnical Engineer
PBQ&D, INC.

Education:	Danish Technical University, C.E. 1960 University of Illinois, M.Sc., Civil Engineering, 1962 Ph.D. Civil Engineering (Soil and Rock Engineering) and Geology, 1969
Societies:	American Society of Civil Engineers Danish Society of Civil Engineers International Society of Soil Mechanics and Foundation Engineering International Society of Rock Mechanics Deep Foundations Institute
Licenses:	Massachusetts, New York, California European Federation of Engineers (FEANI)

Dr. Schmidt has had experience in the evaluation and design of foundations for major bridges throughout the United States. Recent work includes preliminary design studies for the proposed West Seattle Bridge in Washington, the James River Bridge and the Martin Luther King Memorial Bridge in Virginia, and for a variety of bridges for the Singapore Expressway System. He has done foundation evaluation and design for numerous interstate highway bridges throughout the United States. Dr. Schmidt participated in many other transit and highway projects from feasibility studies to final studies to final design and construction supervision for a variety of geotechnical projects.

Dr. Schmidt combines a broad experience in geotechnical and related design work with experience as Project Manager,Project Director and Department Head. He is, at present, in charge of the resident staff at Stanford Linear Accelerator Center in California where the firm is designing and performing construction management services for a major addition to the experimental physics facilities, the Positron Electron Project. From here, he directs design work and coordinated critical work directly with the client. The project involves 7,000 feet (2 km) of tunnel, mined and in cut-and-cover, as well as large experimental and support buildings, road and drainage work, and all power and cooling for the sophisticated magnets, klystrons, vacuum tubes and other experimental equipment.

For the firm's San Francisco Office, Dr. Schmidt also provides expert consultation and design reviews for the San Francisco Outfall Sewer, on topics of offshore constructibility, liquefaction and other seismic and geotechnial problems. The Outfall sewer will be constructed in part as a mined tunnel, in part as an immersed tunnel into the Pacific Ocean.

BIRGER SCHMIDT

During his tenure at the Parsons Brinckerhoff main office in New York, 1971-1976, Dr. Schmidt was the Head of the Geotechnical Department, responsible for Management and Administration and for geotechnical exploration reports and designs for the main office as well as for branch offices. In this capacity, he gained experience and expertise in a broad line of topics, from the most ordinary to the most unusual, technically as well as administratively.

First exposed to immersed tunnel problems in 1960, when Dr. Schmidt worked with the Danish contractor, Christiani & Nielsen, he acquired most of his expertise on immersed tunnels with Parsons Brinckerhoff in New York. Here, he acted as Project Geotechnical Manager for the 2nd Hampton Roads Tunnel, a 2-mile immersed tunnel in Virginia, a organized geotechnical explorations for the 3rd Elizabeth River Tunnel (now under design), also in Virginia. As project geotechnical engineer, he also worked on several smaller maintenance and rehabilitation projects for immersed tunnels, and participated in the investigation of a sewer outfall failure in New York.

Mined or bored tunnels is another of Dr. Schmidt's specialties. As Project Geotechnical Manager, he helped design tunnels and stations for subways in Washington, D.C., and Baltimore, Maryland, built with mechanical shields, with compressed air, grouting and dewatering to stabilize the treacherous sands and gravels. Rock tunnels include the PEP project mentioned above, circulating water tunnels for a nuclear power plant in Texas, and consultation for the Atlanta, Georgia Subways.

Dr. Schmidt also directed research, on contract with the U.S. Department of Transportation, on soil exploration improvements and on improved methods of monitoring tunnel construction. Earlier, as a researcher at the University of Illinois, he conducted tunnel lining design research and related work, under the guidance of Professor R. B. Peck.

Dr. Schmidt was also responsible for bridge foundation designs for a number of bridges, for example, James River Bridge in Virginia; Canje River Bridge in Guyana; 3rd Street (Bascule) Bridge in Wilmington, Delaware; Martin Luther King, Jr. Memorial Bridge in Richmond, Virginia, as well as numerous highway bridge structures of U. S. Interstate Highway Standards.

Ocean and water front structures include general cargo and container port facilities in Ponce, Puerto Rico; Portsmouth, Virginia; Belize; Grande Cayman; coal transshipment facilities in Superior, Wisconsin; shore protection in Samoa; shipyard facilities in Fiji and in Denmark; breakwater and dikes for dredge containment, Lorain, Ohio; and others.

Publications

Of Dr. Schmidt's 20 publications, two papers were on topics of immersed tunnels, senve papers on tunnels in soil, four research reports on exploration, monitoring and tunnel design, one a Handbook fo Monitoring, one paper on waterfront structure design, and five on other research and application topices. Some notables:

BIRGER SCHMIDT

1977, with G. W. Clough, Design and Performance of Excavation and Tunnels in Soft Clay - A State-of-the-Art Report, International Symposium on Soft Clays, Bangkok.

1977, Tunnels in Granular Soils: Washington and Baltimore Case Histories, 9th International Conference on Soil Mechanics and Foundation Engineer, Tokyo.

1976, Monitoring Soft Ground Tunnel Construction - Urban Transportation Tunneling - Handbook of Rational Practice for Planner and Designers, Prepared for Urban Mass Transportation Administration.

1974, Prediction of Settlements due to Tunneling in Soil - Three Case Histories, Rapid Excavation and Tunneling Conference, San Francisco, V.2, pp. 1179-1199.

1974, Exploration for Soft Ground Tunnels - A New Approach, ASCE, Engineering Foundation Conference: Subsurface Exploration for Underground Excavation and Heavy Construction, Henniker, N.H., pp. 84-96.

1973, with T. R. Kuesel and D. Rafaeli, Settlements and Strengthening of Soft Clay Accelerated by Sand Drains, Highway Research Record No. 457, pp. 18-26.

1969, with D. U. Deere, R. B. Peck, J. E. Monsees and H. W. Parker, Some Design Considerations in the Selection of Underground Support Systems, Report to USDOT, OHSGT, Contract 3-0152.

WALTER E. STINGER, JR.
Electrification/Traction Power
Louis T. Klauder and Associates

Education: B. S. Electrical Engineer, (1964), Drexel Univeristy

Since joining Louis T. Klauder and Associates in 1967:

Tri-Met, Portland, Oregon: Systems engineering and analysis in connection with Phase I Alternatives Analysis for a projected Light Rail Transit line. Work included capital and operating cost analysis, traction power and signal system requirements, vehicle availability and performance analysis including tradeoff among current designs and operational requirements.

San Francisco Railway Improvement Corporation: As Assistant Project Manager for light rail vehicle (LRV) acquisition program participated in: (1) evaluation and comment upon proposed U. S. Standard Light Rail Vehicle Specifications and designs, including review with potential car builders and other transit systems; (2) engineering evaluation of the final vehicle design; (3) construction surveillance at the Boeing Vertol plant and resolution of engineering open items; (4) coordination of interface between cab signal equipment and car control circuitry; and (5) resolution of vehicle commissioning problems.

San Francisco Municipal Railway Improvement Corporation: As part of light rail transit system program: (1) evaluated LRV configuration requirements relative to service needs; (2) analyzed, evaluated and prepared the conceptual design of propulsion, speed control and door control logic requirements for LRV specifications and (3) developed engineering design of cab signal and passenger information systems for Muni Metro.

City of Calgary, Alberta: As Assistant Project Manager, assisting in the preparation of specifications and bidding documents and contractor negotiations for light rail vehicles to be acquired for new light rail transit system. Follow-on work includes design, specification and procurement of signal/communication system equipment.

Port Authority Transit, Pittsburgh, Pennsylvania: Participated in the engineering analysis and preparation of design criteria for purchase of new Light Rail Vehicles for an upgraded portion of the PAT Light Rail system.

City of Calgary, Alberta: As Assistant Project Manager, contributed to the car, traction power, signal system and communications preliminary design effort for proposed Light Rail Transit system; analyzed the characteristics of various manufacturers' vehicles relative to their suitability for use in Calgary. Advisory design and analysis for shop layout, work car acquisition and rail car wheel profile requirements.

Massachusetts Bay Transportation Authority: Preliminary design evaluation of cabl signal and automatic train operation (ATO) systems for the proposed northern extenison of the Red Line.

Pennsylvania Department of Transportation: Evaluation of traction power distribution system and layout of communications system for relocation of part of the Frankford Elevated line of the Southeastern Pennsylvania Transportation Authority onto a new right-of-way in the median of the Delaware Expressway (Interstate 95).

Metropolitan Transportation Authority (State of New York): Developed troubleshooting procedures and analyzed break-in problems of 772 M-1 type multiple unit electric commuter cars acquired for use on Long Island Rail Road.

Port Authority Corporation: Prepared detailed troubleshooting manuals for rapid transit car propulsion and auxiliary control system; participated in "on-line" manufacturing inspection at the Budd plant and acceptance testing programs for 75 rapid transit cars.

Metropolitan Commuter Transportation Authority (State of New York): Evaluated performance results of GT-1 gas turbine/mechanical car developed by the Budd Company for testing on the Long Island Rail Road.

RUSH D. TOUTON, JR.

Electrification/Traction Power
Louis T. Klauder and Associates

Education: B.S. Electrical Engineering (1954), Princieton University

Societies:
APTA - LRT Technical Subcommittee
Transportation Research Board - LRT Subcommittee
Franklin Institute
Princeton Engineering Association
U.S. Naval Institute

Since joining Louis T. Klauder and Associates in 1967 he was responsible for the Tri-County Metropolitan Transportation District of Oregon (Tri-Met, Portland): Light Rail Systems Manager for Klauder services for proposed new light rail transit line, including vehicles, electrification, signal system, fare co-lection and route alignment requirements analyses.

Greater Cleveland Regional Transit Authority (GCRTA): Light Rail Systems Manager for Klauder services including design review and engineering support, inspection and testing monitoring, acceptance and warranty assistance for 48 Ligth Rail Vehicles being built by Breda Costruzioni Ferroviarrie, S.P.A. of Pistoia, Italy.

Port Authority of Allegheny County (Pittsburhg), Transit Division: Light Rail Systems Manager for Klauder services on light rail vehicle evaluation, including development of design criteria and preparation of draft specifications, and fare collection system analysis for the State I light rail transit system transportation improvement program.

San Francisco Municipal Railway Improvement Corporation: Light Rail Systems Manager for Klauder services on light rail vehicle (LRV) acquisition and Muni Metro imrpovement programs including: 1) preparation of specifications, design review and acceptance of 100 LRV's being built by the Boeing Vertol Company; 2) preparation of specifications, design review and acceptance of wayside and vehicle-borne equipment of cab signal system (including automatic train control); 3) development program for operations of the Muni Metro subway-surface light rail transit system and; 4) initial maintenance facilities feasibility study.

City of Calgary, Alberta: Light Rail Systems Manager for Klauder services for new light rail transit line, including vehicle, electrification and signal system requirements analyses, and preparation of specifications for 27 light rail vehicles ordered in 1977 from Siemens/DuWag. Follow-on work underway includes design review and inspection of the cars and design, specification and procurement services for the traction power/electrical distribution and signal/communications systems.

Metropolitan Toronto Transportation Plan Review: Project Manager for Klauder services in an evaluation of light rail transit potential in the Scarborough corridor including portions of the study defining the light rail transit concept and establishing vehicle, maintenance facility and electrification requirements.

RUSH D. TOUTON, JR.

Pennsylvania Department of Transportation: Project Manager for Klauder services to prepare specifications and conduct design review for signal, communications, power and track requirements for the relocation of a portion of the City of Philadelphia's Frankford Elevated line (operated by the Southeastern Pennsylvania Transportation Authority) into the median of interstate Route 95, (the Delaware Expressway).

Mass Transportation Administration of the Maryland Department of Transportation: Supervised the development of design criteria for rapid transit cars of the Baltimore Metro System.

Port Authority Transit Corporation: In charge of the design and construction of a vacuum cleaner car, a crane car, and otherwork train equipment for the PATCO Lindenwold high-speed line. Also organized a training program for newly hired operating and maintenance personnel during period of Klauder management of new rapid transit system.

Long Island Rail Road Company: Assisted in an analysis of shop equipment and facility needs coincident with the acquisition by the Metropolitan Transportation Authority (State of New York) of 772 M-1 type multiple-unit electric commuter cars for use on the LIRR. Prepared design for a new electronics shop which was added to the LIRR's existing Dunton MU Car Shop.

General Electric Company - 1960-1967: Adminsitrator - Engineering Resources, Re-Entry Systems Department: Responsible for the operational resource requirements of the 1200 - man Engineering Section. Responsibilities included allocating space, providing plant renovations, obtaining laboratory facilities and equipment through G.E. Investment Funding and through various government funding sources, and maintaining statistics and reports on the seciton plant capacity and facilities capabilities in regard to current and future levels of business. Also did consulting work for the Systems and Technologies Section to establish the Re-Entry Systems Department as a commercial supplier of Systems Management techniques for "Mobility Systems" (i.e. mass transit) to take advantage of the opportunities provided by passage of the Urban Mass Transportation Assistance Act of 1964.

Publications:

Electrification and Control Systems for Light Rail Transit, Transportation Research Board Special Report 161, 1975, presented at the National Light Rail Conference Philadelphia, Pennsylvania, June 23, 1975.

JOHN T. WARREN
Civil/Utility Engineer
J. Warren & Associates

Education:	M.S. Civil Engineering (Engineering-Economic Planning), Stanford University Graduate Study in Economics (M.S. Candidate), Stanford University General Business Administration, Certificate; University of California Extension, Berkeley B.S. Civil Engineering, University of Oklahoma Mechanical Engineering, Oklahoma A & M College
Societies:	Northern California Council of Black Professional Engineers Transportation Research Board National Society of Professional Engineers American Society of Civil Engineers
Licenses:	California - Civil Engineer

Mr. Warren has almost 20 years' experience in the planning, design and construction of major transportation, industrial and public works projects. His engineering experience has included design of major urban freeways, including: a segment of the Junipero Serra Freeway (Interstate Route 280); construction engineer for portions of Route 280, Route 13 and Route 24 freeways; design for heavy industrial facilities including cement, aluminun and steel plants; site design for industrial facilities; and design of an 88-space mobile home park in Solano County.

Mr. Warren joined the Metropolitan Transportation Commission staff in the Commission's formative days. This regional agency has responsibility for regional transportation planning, programming and grant allocation for the nine San Francisco Bay Area Counties. He organized and conducted workshops for city and county planning and public works directors to assure their participation in plan development; participated in the development of objectives and policies; headed a team that developed innovative programs for the first Regional Transportation Plan that included proposed use of bridge tolls for transportation development and formation of an advisory body to spearhead development of low capital operational improvements for the region's existing transportation system; organized the Traffic Coordinating Council, an advisory committee that played a key role in developing a Regional Transportation Control Plan and in making transportation programming decisions.

At MTC, he organized and headed several studies which included: a Transportation Control Plan which had the objective of achieving the National Ambient Air Quality Standard; a regional Parking Management Study that explored ways of reducing vehicle travel; an Air Quality Maintenance Plan which was intended to achieve and maintain the National Air Quality Standard (this effort was later integrated into the ABAG-headed Environmental Management Plan); carried out an analysis and evaluation of alternatives to the proposed Dumbarton Bridge Replacement project which was used by the Commission as the basis of its decision on that project; the 1974 National Transportation Study which projected the transportation needs of 94 cities and nine counties over a 20-year period; a Functional Classification Study of streets and highways in the Bay Area; the Napa Southern Crossing Evaluation which examined alternatives to the State's proposed project to determine if there were more viable ways or meeting existing and future transportation needs in a portion of Napa County.

For the last year and a half, Mr. Warren has been Principal of J. Warren & Associates. Projects under his direction have included design of a mobile home park in Suisun City; environmental impact analysis for the Sacramento Regional Transit District's General Transit Plan; a cost-effectiveness study of alternative ways of increasing capacity of the Bay Division Transmission Pipelines for the San Francisco Water Department; and, an analysis of weekend and night time transit patronage, description of environmental impacts of alternatives including air quality, traffic and energy usage as part of a Financial Needs Study for the San Francisco Municipal Railway. Mr. Warren participated in a benefit-cost study of distance measuring equipment (DME) at airports with instrument landing systems (ILS). The study was performed with Systems Control, Inc. for the Federal Aviation Administration.

JOHN M. WOODS
Traction Power
Transportation Systems Management Consultants

Education:	B.S.M.E., University of California, 1936
Licenses:	California

Mr. Woods' transportation consulting activities include the Municipality of Metropolitan Seattle - sub-consultant to R. W. Beck and Associates of Seattle, Washington for design in connection with the rehabilitation and expansion of the trolley coach system in Seattle, Washington and consultant to the United States Department of Transportation Urban Mass Transportation Administration Application Study for Energy Storage - propelled transit vehicle.

Mr. Woods' prior experience has included being General Manager of the Municipal Railway of San Francisco under administrative direction from the General Manager of Public Utilities. He was directly responsible for all planning, operations and maintenance of the transit system. Directly responsible for planning and augmenting the current 250 million dollar improvement program for the San Francisco Municipal Railway. System currently operates 115 street cars, 335 trolley coaches, 550 motor coaches and 39 cable cars. Number of employees - 2,800.

In the capacity as Superintendent of Operations for the Hetch Hetchy Water and Power System he was responsible for the operation and maintenance of the City of San Francisco's vast water and power complex located in the Sierra Nevada Mountains and the San Joaquin Valley. System includes three major dams and impounding reservoirs, three power houses with a combined capacity of 300,000 KW, three major aqueducts with a capacity of 300,000,000 gallons daily and 200 miles of 114 KV and 230 KV transmission lines with related substations. Number of employees - 115.

He was Electrical Engineer assigned to Transportation Technical Committee of Mayor's Transportation Council to coordinate activities of the City and County of San Francisco with those of Bay Area Rapid Transit District. Project Manager of Cordon Count of all vehicles and pedestrians entering Central Business District of City of San Francisco. In addition was in charge of staff preparing plans and specifications for construction on Municipal Railway, Hetch Hetchy System and San Francisco International Airport. Also member of San Francisco committee on corrosion which committee consisted of members from other city departments and private utilities. Committee was formed to unify efforts to correct corrosion on various utility facilities such as pipe lines, duct lines and conductor sheaths.

BOND M. YEE
Traffic Engineer
PBQ&D, INC.

Education:	University of California, Berkeley, B.S.C.E. University of California, Berkeley, Institute of Transportation and Traffic Engineering M.S.C.E.
Societies:	American Society of Civil Engineers

Since joining Parsons Brinckerhoff, Mr. Yee has been extensively involved in comprehensive transportation planning and traffic operations and planning.

He is currently project engineer for the I-5 North Corridor High Occupancy Vehicle (HOV) Study in Seattle involving the feasibility investigation of various forms of bus and carpool treatment and the investigation of alternative operating and circulation strategies in the CBD area.

He has been involved in various other bus operations-related studies. Two of his recent assignments are the Fullerton Transportation Center Feasibility Study, for which he analyzed transportation- and non-transportation-related demand and planned parking and traffic circulation for a proposed multimodal transportation center, and the Anaheim Intracity Transportation Study, for which he performed transportation demand analysis and the planning and evaluation for a proposed feeder-connector system between Disneyland, the Anaheim Redevelopment area, and Anaheim Stadium.

Mr. Yee had major responsibilities for the Kansas City Regional Transit Study, which resulted in the formation of a comprehensive transportation plan for the year 2000. His primary assignment was the formulation of a modal split model for the region, and he was also involved with highway network adequacy analysis; development and evaluation of alternative transit networks; estimation of patronage potential operating costs and revenues of the alternative transit networks; and evaluation of alternative future land use plans. As a follow-up to this project he was involved in the establishment of level of service criteria for the purpose of implementing and monitoring the short range plan. He also participated in the formation of warrants for busway operation in the inner urban areas and the investigation of concomitant bus operation strategies in the CBD.

Mr. Yee also has extensive experience in traffic operation circulation and parking planning studies. These include: the Foster City Specialty Shopping Center Traffic Study; the Long Beach Greater Pacific Terrace Parking Demand Study; the Golden Gate National Recreation Area, for which he planned and evaluated the transportation facility; the Santa Ana Redevelopment Traffic Study; and the Redwood City Transportation Study.

BOND M. YEE

His responsibilities on the Transportation Study for Redwood City, Califronia were of a comprehensive scope. They included preparation of a preliminary multi-modal transportation plan for the circulation segment of the City's General Plan, and the formulation of general methodology for evaluating the planning and environmental impacts of transportation facilities on Redwood City. His other responsibilities for this project involved the establishment and utilization of travel forecasting and modeling techniques, including trip generation and distribution, modal split, network traffic assignment, highway adequacy analysis, and transportation systems evaluation.

Other transportation-related studies in which he was involved include the West Coast Corridor Transportation Alternatives Study, encompassing Washington, Oregon, and California, for which he was responsible for corridor-level transportation planning.

BENJAMIN YERAKA
Estimating and Costing Engineer
PBQ&D, INC.

Education:	Royal Melbourne Insitute of Technology B.S. 1966 (Australia)
Licenses:	California - Civil Australia - Civil/Structural

Mr. Yeraka has more than 15 years of experience as a civil-structural engineer in estimating, costing, design and construction in general industry. His experience includes: involvement with large engineering projects for internationally known companies requiring consulting and construction management skills.

Mr. Yeraka's cost estimating experience includes:

- Preliminary design and cost estimating of San Francisco Sewer (Wastewater) projects totalling $140 million for permanent and temporary structures above and below ground including dewatering systems.

- Denver Moffat tunnel ventilation improvement program (civil/structural work $1.5 million).

- Various light and heavy industrial complexes in U. S. and overseas totalling some $50 million.

He has had extensive experience in the design and construction management of various structures, foundations, mining complexes, tunnels in steel and concrete, industrial buildings, 125-ton capacity overhead crane systems, cofferdams, tiebacks, slurry walled structures, piles and various underground facilities including transit stations and power tunnels.

Mr. Yeraka has also been responsible for the review of contractor's showing and dewatering plans, engineer's estimates and change orders, preparation of progress reports, evaluations and recommendations for temporary and permanent structures, inspection of construction to check contractor's compliance with design and specifications. He has prepared CPM and bar schedules for a variety of projects

Mr. Yeraka has been responsible for design, resident engineering and construction of turnkey projects in Australia including factories and apartment buildings. He has been responsible for the design and construction coordination for the expansion of the Monsanto Chemical plant in Melbourne, revision and expansion of the Petroleum Refinery at Altona, Australia, Esso Refinery and modifications, and industrial water treatment plant, and a Power House for Imperial Chemical Industries. Also, a 1452 ft. long suspension bridge for slurry pipeline, conveyors, and a township for population of 20,000.

SCOPE OF WORK

The San Francisco Municipal Railway (MUNI) is currently involved in an extensive program of modernization of its transit facilities as part of the MUNI Metro Program. The Transit Improvement Program includes track reconstruction of existing streetcar lines where required; construction of new track for streetcar lines; and construction of new track for streetcar lines extension. The program will specifically include the extension of the J Line beyond its present terminus at Church and 30th Streets to the Muni Metro yards at San Jose and Geneva Avenues.

The proposed scope of work to be accomplished by the Consultant will involve three phases. In general terms, the first phase will include the preparation of a draft and a final Environmental Impact Report/Statement (EIR/EIS), a topographic survey of the proposed line, and preliminary plans and outline specifications for two alternates. In Phase II the Consultant will prepare contract plans and specifications for the extension of the MUNI facilities and include trackwork, electric traction power facilities, required structures, all required curbs and channelization, and pedestrian loading platforms if required. In Phase II the Consultant will assist Muni Staff during the period of construction as required.

Specifically, the plans and specifications will be prepared for extension of the J Line from its present terminal at 30th and Church Streets along 30th Street to either Dolores Street or San Jose Avenue, and then on San Jose Avenue to the MUNI Metro Center at San Jose and Ocean Avenues. Here a track connection will be provided for access to the MUNI Metro Yard. Consideration will be given to combining the J Line Extension with the M Line to form a two-way J/M loop service with outbound J Line cars returning via M Line and vice versa. The plans will also provide for pedestrian access from the Bay Area Rapid Transit (BART) Glen Park Station to the extended J Line and for an improved connection of the N Line at Church Street and Duboce Avenue to the J Line.

The extension to the J Line will effectively reduce N and J Line deadheading cost; minimize potential disruptions to scheduled service in the Market Street Subway; reduce the impact of deadheading car operations on Ocean Avenue; and offer increased service and benefits to transit riders between the Mission District and San Francisco State and City Colleges.

A survey will be made of underground and aboveground utilities to ascertain any conflicts with the proposed J Line Extension. The Consultant will not furnish a composite plan and profile of all existing utilities in the area of new construction. The Consultant will, however, transmit plans and profile tracings to the various utility companies and request that they delineate on the tracings their facilities in the work area. When utility relocation or support work is required, the affected utility will provide MUNI with the plans and specifications for the alteration or relocation of their facilities. The Consultant will coordinate this work for inclusion in the contract plans and specifications.

For the present, and within the concept of this proposal, it will be assumed that the existing I-280 (Southern Freeway) Bridge over San Jose Avenue including abutments, piers, etc., is the property of the State of California. Any change to this bridge will be designed by the State. The Consultant will be required only to coordinate his efforts with the State at the interface between the bridge and the J Line Extension passing underneath it.

During design stages, the Consultant will be prepared to work with the MUNI staff in preparing and making visual, written, and oral presentations of work in progress before interested community and neighborhood groups and organizations.

Under the terms indicated in the Request for Proposal, MUNI staff will supervise construction. The Consultant will be prepared to provide on-site assistance as required. He will also be prepared to provide the necessary construction support services such as review and approval of Contractor submittals which relate thereto and will assist MUNI in interpreting and evaluating Contractor's claims.

WORK PROGRAM

This section of the proposal describes the work required to complete the three phases of the design effort to extend the J Line. The three phases are: Phase I Project Design and Preparation of Environmental Impact Report/ Statement, Phase II Contract Document, and Phase III Consultation During Construction. Summarized herewith is a list of the required work elements by phase, design discipline and task. The time schedule of these elements is illustrated on the bar chart included.

PHASE I PROJECT DESIGN AND PREPARATION OF EIR/EIS. The scope of the effort in this Phase is to determine the most viable track alignment in conjunction with the MUNI staff and to prepare the required draft and final EIR/EIS for the extension. Consultation and coordination of the route alignment with these agencies will be a constituent part of Phase I:

- Hetch Hetchy Water and Power
- Department of Public Works Traffic Engineering Bureau
- San Francisco Wastewater Management Program
- California Department of Transportation.

Task 1.0 Review Existing Information on MUNI's J Line Extension including existing topography maps of area, existing and proposed street layouts with legal grades, plans of existing and proposed utilities, plans of Bosworth Street Overpass and San Jose Avenue Underpass, existing traffic data and City and MUNI standard plans and specifications.

Task 2.0 Traffic Engineering In conjunction with City staff develop acceptable criteria for the control of street traffic and pedestrian during the construction of the project and when the extension is completed and in operation. The major subtasks in this effort are:

2.1 Obtain data and information on the existing traffic conditions and develop data and other information on the conditions proposed or anticipated in the future.

2.2 Identify the problems that will be encountered during operation of the extended J Line, during construction, and at any special areas such as the dipping "S" curve under the I-280 Freeway of San Jose Avenue.

2.3 Develop the traffic engineering criteria for the project to be used in preparing the preliminary and final contract plans.

2.4 Develop the data necessary for inclusion in the EIR/EIS.

Task 3.0 Surveying This task obtains basic information for use during this phase and later phases of this project. The major subtasks are:

3.1 Establish horizontal and vertical survey control for the project area.

3.2 Survey and prepare topographic maps of the Project Areas involved as required including the intersection of Church Street and Duboce Avenue; 30th Street from Church Street to San Jose Avenue; San Jose Avenue from 30th Street to Ocean Avenue; and Dolores Street from 30th Street to San Jose Avenue. In addition to these major tasks survey information will have to be obtained, if required, for the area around the I-280 Freeway Bridge over San Jose Avenue and the BART Glen Park Station for the proposed pedestrian access.

3.3 Prepare cross sections of the streets that will be effected by the project.

3.4 Determine location of all underground and aboveground utilities within the project area.

Task 4.0 Traction Power Develop information to be used in the design of the traction power supply system for the J Line Extenion and is comprised of these subtasks:

4.1 Substations and Distribution: Evaluation of existing modernized substations with regard for adequate capacity at minimum voltage drop to feed the J Line Extension, taking into account both rail car and trolley coach overall demands. Evaluate types of additional substations or modifications to existing substations should inadequacies appear.

4.2 Feeder System: Evaluation of existing feeders and negative returns (including rail size) and recommend additions where necessary. As a corollary, we would provide advice on elimination or control of potential electrolysis problems affecting existing utilities.

4.3 Overhead Design Evaluation of the recent overhead modernization on the other MUNI rail lines to determine if that design is appropriate to the J Line Extension or if modifications or improvements would be desirable - keeping in mind the need for compatibility, minimum stores provisioning, ease of maintenance and minimum visual intrusion. Evaluation of LRV current collection from data already available and to be generated during the balance of the LRV test and acceptance programs to develop such things as optimum pantograph pressure, contact wire type and tension. Evaluation of other overhead hardware such as track switch contactors, temporary signal contractors and trolley coach crossings (e.g., #12-Ocean).

4.4 Prepare criteria for the Traction Power System for the J Line Extension and recommendations to MUNI for changes to their Substation and Distribution Systems outside the Project Area. Included in this subtask will be an identification of any long lead items that may be required.

Task 5.0 Preparation of Preliminary Plans and Specifications Design and prepare preliminary plans and outline specifications for two alternate track configurations on sufficient detail to prepare cost estimates for comparison purposes. In accordance with the Request for Proposals the two alternates will be for the area from 30th Street to San Jose Avenue either directly using San Jose Avenue and the other using Dolores Street. These subtasks are included:

5.1 Preparation of Preliminary Alignment Plans.

5.2 Preparation of Preliminary Traffic Plans showing proposed traffic lanes, crossings and channelization during and after construction

5.3 Preparation of Preliminary Utility Plans. This work will be done in cooperation with the private utilities and the City Departments that are involved with utilities.

5.4 Preparation of Preliminary Civil Plans showing street sections, drainage, etc.

5.5 Preparation of Preliminary Structural Plans which will include analysis of existing structures that may be effected such as the Bosworth Street Overcrossing.

5.6 Preparation of Preliminary Track Work Plans that will identify special work and areas where standard MUNI plans are not applicable. Included in this task will be a comparison of materials estimated to be needed and those available from MUNI inventory. This is to identify any long lead items required for the project.

5.7 Preparation Preliminary Traction Power Plans showing extent of work for this Project.

5.8 Preparation of Preliminary Stations Plans showing location, type and special features to be considered.

5.9 Preparation of Outline Specifications for the Project.

Task 6.0 Preparation of an EIR/EIS in compliance with the California Environmental Quality Act and its guidelines, Office of Environmental Review guidelines, and the requirements of UMTA. The report will address environmental effects in proportion to their severity and probability of occurence, concentrating on areas of specific concern that have been identified by the City. The EIR/EIS will be prepared in an independent and objective manner and will meet all standards

of legal adequacy; it will be reviewed at both the draft and final stages by EIP's staff attorney, who specializes in environmental and land use law, before submittal to MUNI, OER and UMTA. The study will be separated into a number of specific tasks to facilitate the overall management of the study.

6.1. Preparation of Draft EIR which would include the following subtasks.

a. Identification of Issues: Meet with MUNI and OER staff to finalize specific studies that the EIR/EIS will address. Any additional areas of concern will be identified. Adjust the study's emphasis as necessary to reflect responsible agency concerns.

b. Data Collection: Collect all available information relevant to the project. Existing information includes the environmental evaluation contained in the POM report on New Track Linkages N-J Lines, noise measurements or traffic counts developed in that study, and data from other EIRs.

c. Meetings: Participate in setting up and conducting community meetings during preparation of the Preliminary Draft EIR/EIS to elicit community concern and inform public of the EIR/EIS process. We are assuming for this proposal two communicty meetings and one public hearing for the Draft EIR/EIS.

d. Preparation of Preliminary Draft EIR/EIS:

- Conduct additional studies to supplement data collected in Task 2.
- Define the project and its alternatives.
- Identify impacts of the proposed project and its alternatives.
- Develop mitigation measures to reduce impacts.
- Prepare topic sections of report as required by CEQA and NEPA.
- Submit Copies of PDEIR/EIS to MUNI, OER and UMTA for review. It is assumed that this review period will take three (3) weeks.

6.2. Revision of Draft EIR/EIS:

- Receive comments on report and revise report as requested.
- Review revised report sections with MUNI, OER and UMTA and prepare final revisions if necessary.
- Print 250 copies of the Draft EIR/EIS.

4. Noise and Vibration

    a. Evaluate recent noise measurements in the alternative corridors and take additional noise measurements in sensitive areas along the alternative routes to establish baseline noise conditions against which construction, operational, and maintenance noise impacts could be assessed.

    b. Evaluate the impacts of the construction of the J Line Extension on adjacent land uses and determine the noise impacts associated with operation and maintenance of the J Line Extension. Up-to-date data on the noise levels expected from the new light-rail vehicles (LRVs) would be used in the analysis.

    c. Evaluate the impact of wheel/rail interaction as it is manifested in ground vibrations. Depending on the degree of predicted vibration it may be necessary to evaluate the existing levels of vibration along the proposed routes to determine whether the amount of vibration introduced by the railway would be significantly different than existing vibration levels in the area.

    d. Depending on the extent of the noise impacts identified, propose mitigation measures which could be included as part of the project to mitigate noise impacts. These would include proper maintenance of the rolling stock and trackage.

5. Vegetation Analysis

    a. Conduct a field survey of the site.

    b. Inventory and describe existing vegetation, especially noting the palm trees in the Dolores Street median.

    c. Assess the project's impact on vegetation.

    d. Discuss mitigation measures where appropriate.

6. Urban Design

    a. Analyze the aesthetic character of the environment.

    b. Analyze the urban design aspects of the proposed project, especially overhead wires, safety walls and the compatibility of the project with the streetscape.

    c. Suggest mitigation measures where appropriate.

6.3 Public Hearings on Draft EIR/EIS. Participate in setting up and conducting one public hearing based on the Draft EIR/EIS to obtain comments for inclusion in the Final EIR/EIS.

6.4 Preparation of Final EIR/EIS:

- Assist OER and UMTA in preparing responses to comments received on the Draft EIR/EIS.
- Print 100 copies of the Final EIR/EIS.

KEY ISSUES

While the EIR/EIS will address all subjects required by law, the emphasis of the report will be on the following key issues:

1. Land Use Analysis
   a. Describe the existing use of the corridor.
   b. Determine General Plan designations and current zoning classifications of the project.
   c. Identify and evaluate the impact of the proposed project on neighboring land uses.
   d. Discuss mitigation measures where appropriate.

2. Traffic Analysis
   a. Describe existing traffic conditions, vehicular and pedestrian.
   b. Determine construction procedures that will be used.
   c. Determine future traffic conditions including proposed MUNI operations in this corridor.
   d. Identify areas of concern for the safety of traffic, pedestrians, and LRV.
   e. Discuss mitigation measures that are possible and feasible.

3. Air Quality Analysis
   a. Analyze existing data from BAAQMD, CALTRANS traffic data, and other available sources.
   b. Using relevant Weather Bureau and anticipated traffic circulation data, project future air pollutant levels as a result of the proposed project, identifying locations of high concentrations.
   c. Provide a general interpretation of air pollution projections, with reference to appropriate standards and existing air quality.
   d. Discuss possible and feasible mitigation measures.

7. Soils, Geology and Seismic Risk

   a. Using available information, the soils and geologic conditions of the area will be discussed.

   b. Identify potential geotechnical problems of the site, and propose mitigation measures for project design.

8. Hydrology

   a. Examine existing topography and analyze proposed grading plans.

   b. Determine drainage areas and calculate changes in peak rate and volume of run-off.

   c. Evaluate methods for disposing of drainage.

9. Energy Analysis

   a. Estimate the energy cost of project construction.

   b. Estimate the annual energy consumption of the project and compare to energy savings from reduced deadheading.

   c. Estimate fuel savings from reduced auto trips due to increased transit patronage.

10. Public Services Utilities

   a. Analyze project-generated demands on the City's public safety, and utility services.

   b. Determine the existing level of service and capacity of public services and utilities with respect to the project.

   c. Assess impacts of the project on public services and utilities.

   d. Discuss mitigation measures where appropriate.

11. Fiscal Impacts of the Proposed Project

   a. Estimate costs of the project to the City on an annual basis, considering both capital and operating costs.

   b. Estimate costs saved by the project due to reduced deadheading.

   c. Estimate revenues generated by the project on an annual basis.

   d. Calculate whether the project is a fiscal net gain or loss for MUNI as a whole.

12. Archaeology

   a. Survey literature to determine the presence of any known archaeological sites in the corridor.

   b. If sensitive areas are identified, recommend appropriate mitigation measures for project design and construction.

13. Alternatives

   a. Delineate alternatives to be addressed in the study.

   b. Determine level of detail of analysis for each alternative.

   c. Evaluate the impacts of project alternatives and compare to the proposed project.

Task 7.0 Preliminary Cost Estimate Prepare an engineer's estimate of cost based on the preliminary plans and specifications and providing the information necessary for the comparison of costs for the two alternatives.

PHASE II CONTRACT DOCUMENTS. In Phase II the Consultant will prepare the final contract plans and specifications to be used by the City in the procurement of competitive bids for construction, a detailed construction cost estimate and a construction schedule for the work to be done. Work on this Phase will commence upon written approval of documents prepared for Phase I. The plans and specifications will be prepared to identify and include additive or deductive bid items to insure that the bid price is within available funds. The Consultant will also provide assistance to MUNI staff in the evaluation of construction bids. The final output of this Phase will be reproducible copies of all drawings and specifications for MUNI to use in the final printing. The Tasks within this Phase are:

Task 1.0 Review of Preliminary Plans and incorporating comments and instructions received from the City as a result of their review of the Phase I document.

Task 2.0 Prepare Detailed Contract Plans for inclusion in the contract document to be used for bidding purposes. The various disciplines or types of drawings to be prepared are shown by these subtasks:

2.1 Alignment Plans.

2.2 Traffic Control and Channelization Plans.

2.3 Utilities Plans for relocation or support in place of existing utilities.

2.4 Civil Engineering Plans for street reconstruction, drainage, etc.

2.5 Trackwork Plans.

2.6 Structural Plans including new pedestrian bridge to serve the Glen Park Station area and any reconstruction work that may be necessary to existing bridge.

2.7 Traction Power Plans including substation modifications if necessary, duct lines, installation of feeders and the overhead catenary system.

2.8 Station Plans for those stops which will require development beyond a simple street stop.

Task 3.0 Preparation of Specifications for the construction contract. The Consultant will prepare the Special Provisions and be responsible for the Technical Sections of the contract documents. Specifications will be written in a concise and clear manner in order that construction work can be properly prosecuted.

Task 4.0 Preparation of Cost Estimate. Based on the approved design and construction contract documents, prepare a detailed construction cost estimate (Engineer's Estimate) which will constitute the City's estimate for evaluation of bids for the award of the construction contract.

Task 5.0 Preparation of Construction Schedule. Based on the final contract documents approval a construction schedule will be prepared to be used in developing the cost estimate, evaluating the bids received from various contractors and as a guide for the construction management of the Project.

Task 6.0 Evaluation of Bids. Upon receipt of the bids for the construction contract the Consultant will assist MUNI staff in an evaluation of these bids.

PHASE III CONSTRUCTION. During the construction phase of the project the Consultant will provide assistance to the City's construction management staff to insure that all work is being provided in accordance with the contract plans and specifications. The specific tasks required of the Consultant are:

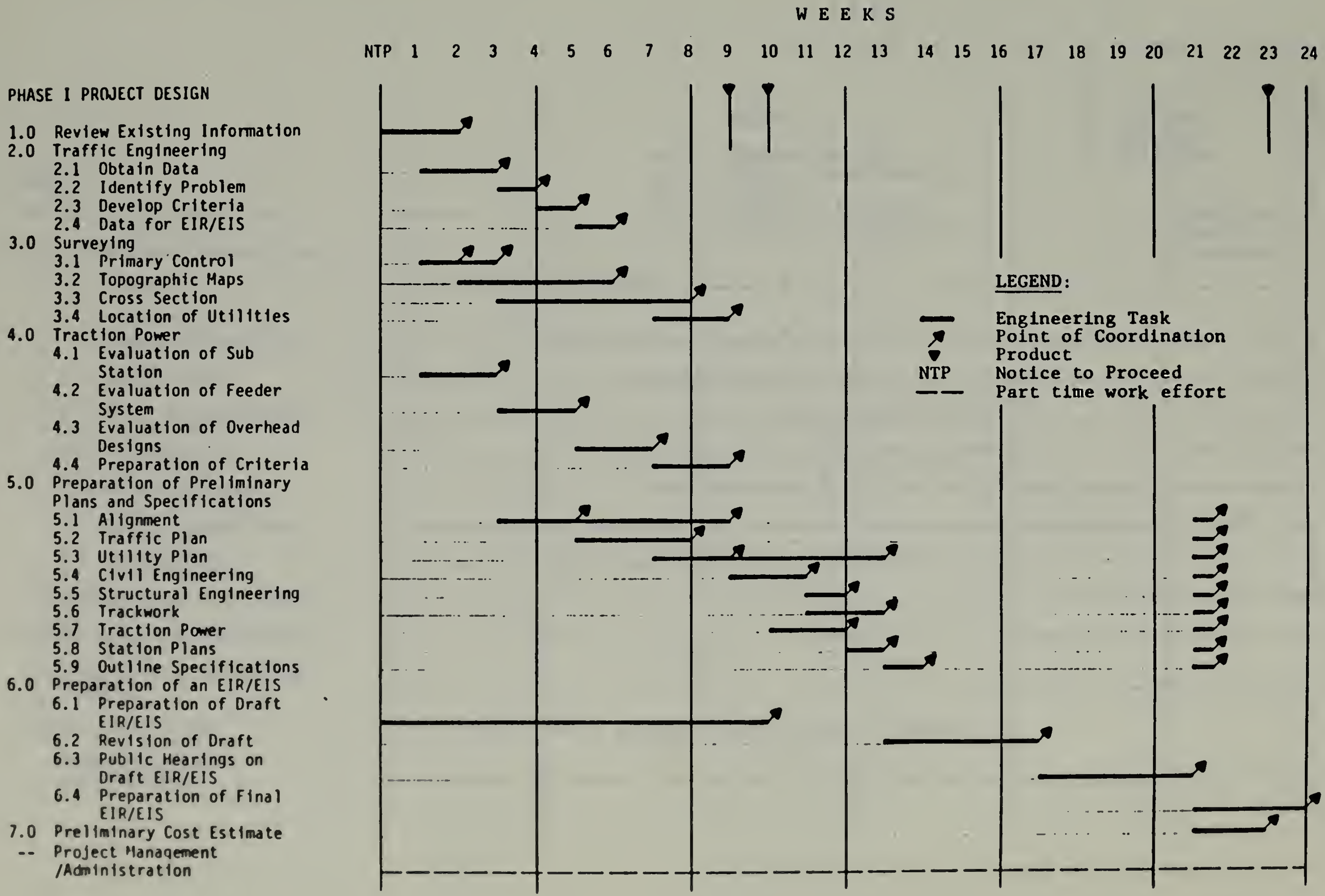
Task 1.0 Assist Resident Engineer and his supporting field staff to administer and inspect the contract including factory inspections of materials to be furnished by the Contractor.

Task 2.0 Design Support where the Consultant will provide members of his staff to review, check and approve Contractor's submittal and shop drawings.

Task 3.0 Evaluation of Contractor's Claims. The Consultant will provide members of his staff to assist the City in interpreting and evaluating Contractor's claims after completion of the construction contract.

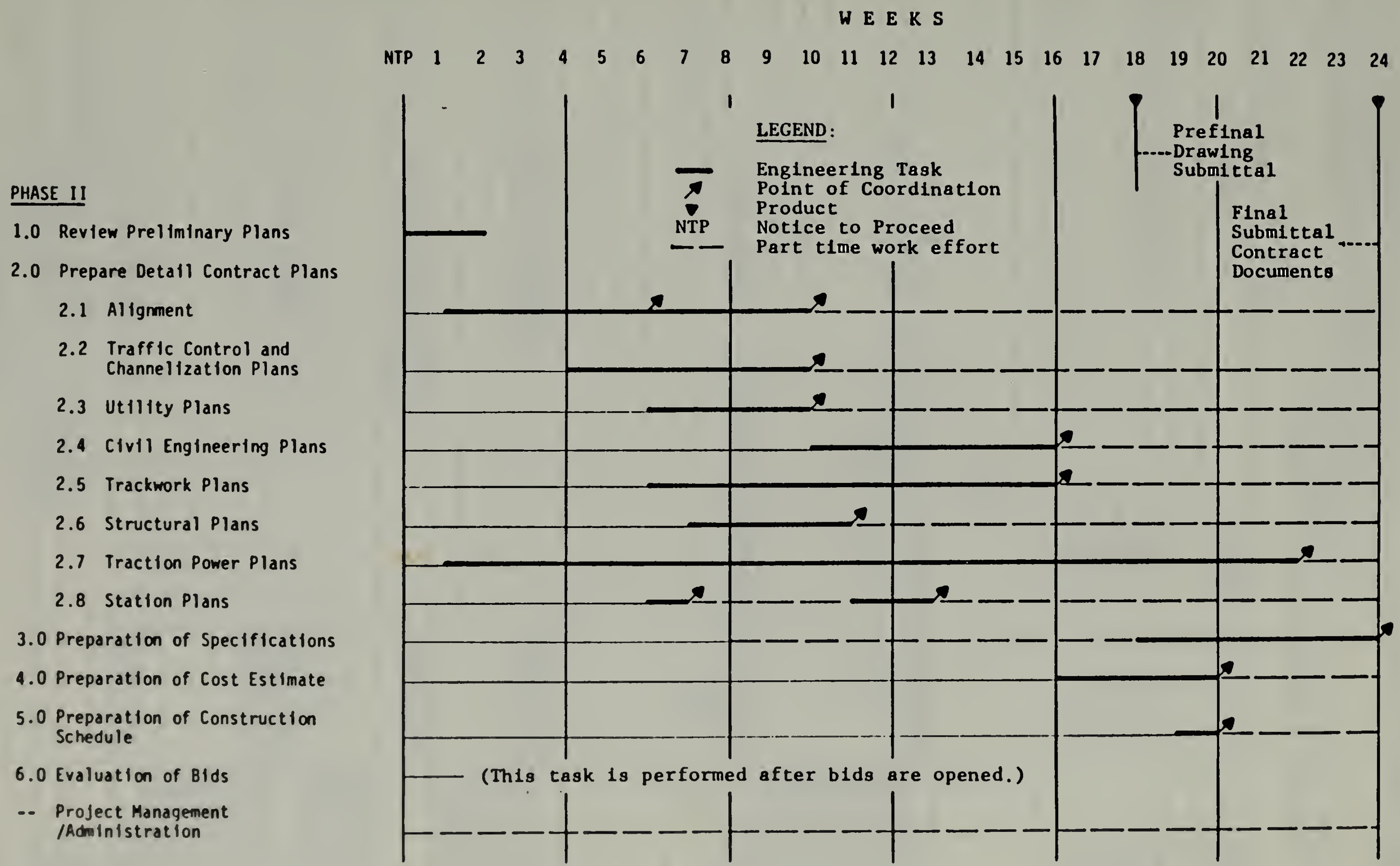
DESIGN OF J-LINE EXTENSION

PROJECT SCHEDULE



DESIGN OF J-LINE EXTENSION

PROJECT SCHEDULE



FEDERAL AVIATION AGENCY

CÓST AND PRICE ANALYSIS - RESEARCH AND DEVELOPMENT CONTRACTS

Form approved
Budget Bureau No. 04-R128

This form is to be used in lieu of FAA Form 3515 as provided under FAPR 2-16.260-2, it will be executed and submitted with proposals in response to "Requests for Proposals," for the procurement of research and development services. If your cost accounting system does not permit analysis of costs as required, contact the purchasing office for further instructions.

PURCHASE REQUEST NUMBER

NAME AND ADDRESS OF OFFERER
PBQ&D, Inc.
165 Post Street, San Francisco, CA. 94108

TITLE OF PROJECT
Design of J Line Extension - Phase I

DETAIL DESCRIPTION	ESTIMATED HOURS	RATE/HOUR	TOTAL ESTIMATED COST *(Dollars)*
1. DIRECT LABOR *(Specify)*			
Project Management & Supervising Engineer	664	19.50	12,948
Senior Engineer	400	15.00	6,000
Engineer	528	10.50	5,544
Technical Support	656	8.25	5,412
Administrative Aide	120	6.25	750
TOTAL DIRECT LABOR			30,654

2. BURDEN *(Overhead - specify)* DEPARTMENT OR COST CENTER	BURDEN RATE	X BASE =	BURDEN ($)	
PB&Q&D, Inc.	1.415	30,654	43,375	
TOTAL BURDEN				43,375

3. DIRECT MATERIAL Tracing Vellum	200	
Prints	870	
TOTAL MATERIAL		1,070
4. SPECIAL TESTING *(Including field work at Government installations)*		
TOTAL SPECIAL TESTING		
5. SPECIAL EQUIPMENT *(If direct charge - specify in Exhibit B on reverse)*		
. TRAVEL *(If direct charge)*		
a. TRANSPORTATION		
b. PER DIEM OR SUBSISTENCE	200	
TOTAL TRAVEL		200
. CONSULTANTS *(Identity - purpose - rate)*		
See Item 16		
TOTAL CONSULTANTS		139,688
. SUBCONTRACTS *(Specify in Exhibit A on reverse)*		
OTHER DIRECT COSTS *(Specify in Exhibit B on reverse - explain royalty costs, if any)*		1,300
TOTAL DIRECT COST AND BURDEN		216,287
. GENERAL AND ADMINISTRATIVE EXPENSE *(Rate % of item nos.*		
TOTAL ESTIMATED COST		216,287
. FIXED FEE OR PROFIT *(State basis for amount in proposal)*		14,315
TOTAL ESTIMATED COST AND FIXED FEE OR PROFIT		230,602

AA Form 4400-2 (5-66) SUPERSEDES FAA FORM 3515-1

0052-625-9000

15. OVERHEAD RATE AND GENERAL AND ADMINISTRATIVE RATE INFORMATION

A. GOVERNMENT AUDIT PERFORMED DCAA	DATE OF AUDIT 4/12/79	ACCOUNTING PERIOD COVERED Oct. 31, 1977 - Oct. 31, 1978

B. NAME AND ADDRESS OF GOVERNMENT AGENCY MAKING AUDIT

DCAA
252 - 7th Avenue
New York, New York 10001

C. DO YOUR CONTRACTS PROVIDE NEGOTIATED OVERHEAD RATES? ☒ NO ☐ YES *(If yes, name Agency negotiating rates)*

D. *(If no Government rates have been established furnish the following information)*

DEPARTMENT OR COST CENTER	RATE	BASE	TOTAL INDIRECT EXPENSE POOL	BASE FOR TOTAL

16. EXHIBIT A - SUBCONTRACT INFORMATION *(If more space needed, use blank sheets, identifying item number)*

NAME AND ADDRESS OF SUBCONTRACTOR(S)	SUBCONTRACTED WORK	SUBCONTRACT	
		TYPE	AMOUNT
EIP/ERA	EIR/EIS		43,577
DD&A	Surveying		51,312
L.T.Klauder & Assoc.	Electrical Dist. Analysis		25,726
J. Warren & Assoc.	Utilities		12,573
C. M. Salter	Acoustic Consultant		4,000
J. Woods,TSMC	Electrification		2,500

17. EXHIBIT B - OTHER DIRECT COSTS *(Specify. If more space needed, use blank sheets, identifying item number)*

Communications	600
Computer	200
Other	300

CERTIFICATE

The labor rates and overhead costs are current and other estimated costs have been determined by generally accepted accounting principles. Bidder represents: (a) that he ☐ has, ☒ has not, employed or retained any company or person *(other than a full-time bona fide employee working solely for the bidder)* to solicit or secure his contract, and (b) that he ☐ has, ☒ has not, paid or agreed to pay to any company or person *(other than a full-time bona fide employee working solely for the bidder)* any fee, commission, percentage or brokerage fee, contingent upon or resulting from the award of this contract, and agrees to furnish information relating to (a) and (b) above, as requested by the Contracting Officer.

(For interpretation of the representation including the term 'bona fide employee,' see (Code of Federal Regulations, Title 44, Part 150.)

NUMBER OF CONTRACTOR EMPLOYEES ☒ 500 AND UNDER ☐ OVER 500 ☐ OVER 750 ☐ OVER 1,000	STATE INCORPORATED IN New Jersey
DATE 6/22/79	SIGNATURE AND TITLE OF AUTHORIZED REPRESENTATIVE OF CONTRACTOR Raymond W. Holdsworth, Vice President R W Holdsworth

APPENDIX

PARSONS BRINCKERHOFF

WESTERN REGION

165 Post Street
San Francisco, California 94108

AFFIRMATIVE ACTION PROGRAM

MAY 15, 1979 - MAY 14, 1980

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- Responsibility for Implementation
- Dissemination of Policy
- Development and Execution of Program
- Other Supportive Activities

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- Parsons Brinckerhoff - Western Region, As of May, 1979
- Staffing List
- Termination Report
- Utilization Analysis
- Affirmative Action Data - female & minority population estimates
- Employed Population 16 and over, by occupation, by race and by ethnic groups
- Graduate Degrees to Women and Minorities, University of California
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SECTION A

POLICY

Parsons
Brinckerhoff

PBQ&D, Inc. Engineers • Architects • Planners

May 15, 1979

POLICY STATEMENT

Parsons Brinckerhoff - Western Region

It is and shall continue to be the policy of Parsons to eliminate and avoid discrimination against any employee or applicant for employment because of race, color, religion, age, sex, national origin, ancestry or physical disability, including blindness. It is and shall continue to be the policy of PBQ&D, Inc. to base all decisions concerning employment so as to promote the principle of Equal Employment Opportunity. Accordingly, all recruiting, hiring and promoting for all job classifications will be made without regard to race, color, religion, sex, age or national origin or ancestry or physical disability, including blindness, except in the case of a bona fide occupational qualification. Only valid requirements for promotional opportunities are imposed. We shall make every effort to ensure that all personnel actions, including but not limited to classification, compensation, benefits, recruitment, transfers, promotions, layoffs and rehires from layoffs, company-sponsored social recreation programs and facilities will be administered without regard to race, color, religion, age, sex (except in the case of a bona fide occupational qualification) or national origin, ancestry or physical disability, including blindness.

Paul H. Gilbert
President

165 Post Street • San Francisco, California 94108 • 415-986-2929 • Cable: Parklap, San Francisco • Telex WU3-4763

A Subsidiary of Parsons Brinckerhoff Quade & Douglas, Inc.

RESPONSIBILITY FOR IMPLEMENTATION

An Officer of the firm is charged with the responsibility of securing compliance with our Affirmative Action Policy in all personnel decisions, particularly recruiting, hiring, compensation, benefits, transfers, layoffs, rehires from layoffs, and any company-sponsored educational, social, and recreational programs.

The Equal Opportunity Officer is responsible for technical compliance, developing an acceptable Affirmative Action Program, designing and compiling auditing reporting systems, discussing areas of underutilization of minority groups and women, discussing Equal Employment Opportunity Policy with supervisors and employees to ensure familiarity with the company's Affirmative Action Policy, to see that all employees and applicants have full and equal opportunities, and to serve as liaison officer with employment agencies, minority groups and women's groups. Mr. W. Davidson, Personnel Director, is assigned as the Equal Employment Opportunity Officer for the Parsons Brinckerhoff companies and Kathie E. Sailer, Administrative Manager, is assigned as Equal Employment Opportunity Officer for Parsons Brinckerhoff, Western Region.

The Equal Opportunity Officer will coordinate the firm's Affirmative Action Program, its internal and external dissemination, and advise the management of the latest developments in the equal employment opportunity field. His/Her responsibilities include:

1. Developing policy statements, affirmative action programs, and internal/external communication techniques.

2. Assisting in the identification of problem areas and establishing goals.

3. Assisting supervisory personnel in arriving at solutions to problems.

4. Designing and implementing audit and report systems that will measure the effectiveness of the programs and indicate where a remedial action is needed and determine the degree to which the goals and objectives of the firm's program have been attained.

5. Serving as liaison between the firm and the enforcement agencies, minority organizations, women's groups, and community action groups.

6. Advising the firm's officers of the latest developments in the equal employment opportunity area.

DISSEMINATION OF POLICY

It is the intent of the Parsons Brinckerhoff, Western Region, Affirmative Action Program to disseminate its policy both internally among its employees and externally with those who have some relationship with the firm.

The following means will be used to disseminate the policy within the internal structure of the company:

- The policy of Affirmative Action and the federal notice of Equal Employment Opportunity are posted on all employee bulletin boards.

- Each new employee will be notified of the firm's policy on Affirmative Action.

- All supervisory personnel will be notified of the firm's Affirmative Action Policy and will be advised to communicate this policy to each employee who serves in a direct-line relationship.

- At meetings of the management and supervisory personnel, the Equal Opportunity Officer of the company/region will specifically note and call to the attention of all such personnel the firm's policy and the individual responsibilities of all supervisory personnel to effectuate and maintain the responsibility for the establishment of a proper Affirmative Action Program.

- Posters and notices will be posted on the firm's bulletin boards and called to the attention of supervisory and managerial personnel, as well as the employee staff.

- Non-discrimination policy statements will be included in all personnel manuals, booklets and other employee literature.

All supervisors are told that evaluation of their performance as a supervisor will include their capacity and performance in compliance with the Affirmative Action Program.

The dissemination of the firm's Affirmative Action Policy is called to to the attention of all sources having any relationship with the company as follows:

- All recruiting sources will be informed of the establishment of the firm's official policy on affirmative action. A copy of the policy statement will be mailed to recruitment sources. It will be specifically noted that the recruiting source is requested to actively recruit minorities and females in all positions listed (unless there is a bona fide occupational qualification which would restrict such recruitment).

- No purchase order, lease or contract covered by or subject to Executive Order #11246, as amended, or the rules and regulations of implementing said Executive Order, shall be signed, issured or negotiated unless an Equal Employment Opportunity clause is contained therein.

- All appropriate subcontractors, vendors and suppliers are notified of the firm's policy on affirmative action. The Affirmative Action Policy is called to their specific attention by the purchaser at the time of the purchase order, and it is specifically requested that there be appropriate action on their part.

- The firm will notify community agencies and program directors, who are specifically oriented toward recruitment activities for minority groups and for women's organizations, that there is a company Affirmative Action Program and that the company is actively seeking and recruiting minority members and women employees.

- "Equal Opportunity Employer, Male/Female/Handicapped" will be included in all recruitment advertisements, newspapers and technical journals including those specifically directed to minority, women's groups, veterans' groups and the handicapped.

- No purchase order or subcontract of $2,500.00 or more, unless exempted by the rules, regulations or orders of the Secretary of Labor issured pursuant to

- Section 503 of the Rehabilitation Act of 1973, will be issued unless provisions are made requiring Affirmative Action to employ, advance in employment and make reasonable accommodations for physical and mental limitations of employees or applicants unless the accommodation imposes undue hardship on the conduct of the firm's business.

- The policy is communicated to all prospective employees so they may avail themselves of the opportunities of the program.

● DEVELOPMENT AND EXECUTION OF THE PROGRAM

It is the policy of this firm to conduct such recruitment in order to best effectuate the Affirmative Action Program. The company will continue to notify recruiting sources of minorities, women's groups, veteran's groups, and the handicapped of the opportunities within the firm and all employment agencies that we actively recruit minority, female, veteran and handicapped members for all job vacancies. Minority, women, veteran and handicapped members of the current staff are encouraged to actively seek and refer applicants to fill job openings. All personnel actions of every type, including hiring, upgrading, promotions, transfers, demotions, layoffs, and terminations, are reviewed to ensure that the action was taken without bias and to help to effectuate the purpose of the Affirmative Action Program. During the meetings with supervisory personnel, their actions will be reviewed to ensure their support of the firm's Equal Opportunity Policy. Representatives of the firm will continue to work with appropriate agencies and groups withing the community so as to cooperate in the further development of community acceptance and adoption of nondiscriminatory policy is carried out. Where applicable, all recruiting sources and managers will be required to report their progress in attaining unit goals, and in meeting timetables.

We will take affirmative action to employ and advance in employment any qualified individual defined as "any individual who has a physical or mental disability which, for such individual, constitutes or results in a substantial handicap to employment".

We will make a reasonable accomodation to the physical and mental limitations of an employee or applicant, unless the accommodation imposes undue hardship of the conduct of our business.

The Equal Opportunity Officer of the company region is required to develop an internal audit and report and advise top management of the program's effectiveness and to make recommendations for improvement if the program is found unsatisfactory.

● OTHER SUPPORTIVE ACTIVITIES

The firm will continue to support the minority training program of the Bay Area Engineering Societies Committee on Manpower Training Inc. (ESCMT) programs developed by such organizations as the NATIONAL Alliance of Businessmen, and other organizations concerned with employment opportunities for the minorities or women. Over the past two years, Parsons Brinckerhoff, Western Region, has employed 4 minority Student interns - 3 from ESCMT and 1 from St. Ignatius High School. Two of the ESCMT interns are now permanent, full time employees of the firm. Parsons Brinckerhoff, Western Region, has also contributed over $6,000 to ESCMT's Scholarship Fund over the last two year period.

Parsons Brinckerhoff continuously implements a Staff Development Plan throughout the Region. Western Region personnel attend training and educational courses and seminars in accord with the plan. Within the past six month's alone, staff have attended courses and received training in such areas as project management, project scheduling and cost control, solar energy, code reviews, earthquake engineering, advanced accounting, time management for secretaries and administrative assistants, word processing, and the like.

Parsons Brinckerhoff continues to support local, small, minority and women - owned businesses as well in its day-to-day operations, by seeking out and utilizing these firms to provide such services as printing, messenger services, travel arrangements, and the like.

Parsons
Brinckerhoff

F - Female
M - Male

* W - White
A - Asian American
SSA - Spanish Speaking American
B - Black

EMPLOYEE	TITLE	RACE	SEX
Everson, J.E.	Senior Vice President, Parsons Brinckerhoff	W	M
Gilbert, P.H.	President, PBQ&D, Inc. Sr. Vice Pres., Parsons Brinckerhoff	W	M
Holdsworth, R.W	Vice President	W	M
Bibbes, P.G.	Chief Engineer/Asst. V.P.	W	M
See-Tho, K.K.	Supv. Engr. Civ/Str./Asst. V.P.	A	M
Sailer, K.E.	Admin. Mgr./Asst. Corp. Sec.	W	F
Cushman, D.J.	Proj. Mgr. - Planner	W	M
McClung, M.	Supv. Engineer	W	M
Schneider, M.I.	Sr. Trans. Planner/Asst. V.P.	W	M
Armento, W.J.	Supervising Engineer	W	M
Danielson, S.L.	Supervising Architect	W	M
Follenfant, H.L.	Supervising Engineer - Mech.	W	M
Holit, G.E.	Supervising Engineer - Civil	W	M
Kaupe, I.M.	Supervising Engineer - Civil	W	M
King, E.H.	Supv. Eng - Tunnels/Asst. V.P.	W	M
Murphy, G.J.	Supv. Eng. - Marine Str./Asst. V.P.	W	M
Sassani, J.J.	Sr. Engineer - Electrical	W	M
Schmidt, B.	Supv. Eng. - Geotech./Str.	W	M
Stanske, G.P.	Supv. Eng. - Civ.	W	M
Van Weele, B	Supv. Eng. - WR/Asst. V.P.	W	M
White, J.F.	Supv. Planner	W	M
Altshuler, E.	Sr. Engineer	W	M
Balagot, P.F.	Sr. Struc. Eng.	A	M
Belvedere, J.A.	Sr. Eng. - Structural	W	M
Berg, R.	Sr. Planner	W	M
Bush, R.	Architect	W	M
Camp, W.H.	Sr. Eng. - Spec.	W	M
Corlett, M.	Sr. Planner	W	M
Eckland, V.	Engineer	W	M
Eisenberg, Y.	Sr. Engineer - Struct.	W	M
Firth, D.	Planner	W	F
Frysztacki, W.	Sr. Planner	W	M
Futch, M.	Sr. Engineer - Structural	B	M
Goedhart, R.	Sr. Planner	W	M
Iwai, D.H.	Sr. Planner	A	M
Jones, K.S.	Planner	W	F
Kasakow, S.V.	Sr. Eng. - Struct.	W	M
Kret, E.	Planner	W	F
Kushins, J.	Engineer	W	M
Langer, G.	Sr. Eng. - Struct.	W	M
Lu, C.K.	Sr. Eng. - Civ./Trans.	A	M
Matrisian, R.	Engineer	W	M
Matsuoka, P.	Planner	A	M
Novak, E.	Architect	W	M
Ochoa, P.	Engineer	A	M

SECTION B

SUPPLEMENTAL INFORMATION

IDENTIFICATION OF UTILIZATION

The San Francisco Regional Office consists of 56 employees of which 4 are black, 10 are Hispanic, 10 are Asian Americans and 41 are white. Of these, there is 1 female manager, 1 female project administrator, 1 female engineering aide, 1 female personnel assistant and 5 female secretaries/clerks.

The Santa Ana, Sacramento, and Seattle Branch offices, assigned to the San Francisco Regional Office for administrative and operational management, consist of a total of 17 personnel -- 7 white females, 2 Asian males, and 8 white males. Four of the white females are professional planners.

Job Categories

1. Officers and Managers

   The Region currently has 12 personnel in this category. This includes 2 Senior Officers, 1 Vice President, 6 Assistant Vice Presidents, 1 Assistant Corporate Secretary and 2 Office Managers. One of the Assistant Vice President's is Asian American. The Assistant Corporate Secretary is female.

2. Professional

   There are currently 46 employees in this category, 34 in the San Francisco Office, 7 in the Santa Ana Office, and 4 in the Seattle Office. Of the total (46), 2 are black and 6 are Asian American. Of the total, 5 are female.

3. Technical

   The Western Region of Parsons Brinckerhoff has 5 employees in this "Technical" category. Of these, 1 is Hispanic, 2 are Chinese and 1 is female.

4. Office Clerical/General Support

   There are 10 employees in this category. All except one are female. Of the 10, 3 are Asian American and 2 are Black.

PARSONS BRINCKERHOFF - WESTERN REGION

As of May, 1979

	TOTAL EMPLOYEES			MINORITY GROUP EMPLOYEES (Male)						MINORITY GROUP EMPLOYEES (Female)						
Categories	Incl. Minorities	Male Incl. Minorities	Female Incl. minorities	Black	Spanish Origin	Asian	Filipino	Amer. Ind.	Other Non-White	Black	Spanish Origin	Asian	Filipino	Amer. Indian	Other non-White	Total of Minorities
Officers/ Managers	12	11	1			1										
Professional	46	41	5	2		6										
Technical	5	4	1		1	2										
Office/ Clerical	10	1	9			1				2		2				
TOTAL	73	57	16	2	1	10				2		2				17

F - Female W - White SSA - Spanish Speaking American
M - Male A - Asian American B - Black

EMPLOYEE	TITLE	RACE	SEX
Reitz, L.	Planner	W	F
Rose, E.	Planner	B	M
Saxer, H.	Sr. Engineer	W	M
Slakey, D.	Engineer	W	M
Sysoyev, I.N.	Sr. Engineer	W	M
Twomey, J.	Admin. Asst./Proj. Admin.	W	F
Weaver, D.	Technical Writer	W	M
Williams, M.	Planner	W	M
Willoughby, T.	Admin. Asst./Proj. Admin.	W	M
Yee, B.M.	Engineer	A	M
Yeraka, B.	Sr. Engineer	W	M
Albreaux, D.R.	Sr. Designer - Struc.	W	M
Dare, R.W.	Sr. Designer - Struc.	A	M
Laloue, P.	Sr. Designer	W	M
Loh, E.	Designer - Struct.	A	M
Lopez, K.R.	Draftsman - Struct.	SSA	M
Manning, B.A.	Draftsperson - Civ.	W	F
TeBoekhorst, G.	Designer - Civ.	W	M
Cahill, J.Y.	Exec. Secretary	A	F
Carroll, T.	Personnel Asst.	B	F
Driscoll, S.	Exec. Secretary	W	F
Fong, J.	Exec. Secretary	A	F
Fox, L.M.	Admin. Asst.	W	F
Hill, L.F.	Receptionist/Typist	W	F
Joyner, C.F.	Secretary	B	F
McDowell, M.	Admin. Secretary	W	F
Omania, L.M.	Office Assistant	A	M
Saucier, L.	Receptionist/Typist	W	F

PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.

TERMINATION REPORT

PERIOD: May, 1978 through May, 1979

JOB GROUP	TOTAL TERMINATED	TOTAL FEMALES	MALES				FEMALES				REASON *	
			BLACK	HISP.	A OR PI	AMER. INDIAN	BLACK	HISP.	A OR PI	AMER INDIAN	V	I
OFFICIALS & MANAGERS												
PROFESSIONALS	13	1	2		1				1		12	1
TECHNICIANS	4				3						1	3
OFFICE/CLERICAL	6	3					2				5	1
TOTALS	23	4	2		4		2		1		18	5*

*V - Voluntary: Resignation

I - Involuntary: Release, Discharge, Layoff, Etc.

* All were layoffs due to lack of work in employees appropriate skill/discipline.

UTILIZATION ANALYSIS

- I -

MINORITIES*

UTILIZATION ANALYSIS - ALL MINORITIES						
JOB GROUP	TOTAL	MINORITIES		AVAILABILITY %	UNDERUTILIZATION	
		#	%		YES	NO
Officers/Managers	12	1	8	7.2		X
Professional	46	8	17	16.0		X
Technical	5	3	60	19.1		X
Office/Clerical	10	5	50	26.0		X
TOTAL	73	17	23			

*Black
Hispanic
Asian or Pacific Islander
American Indian

AFFIRMATIVE ACTION DATA
FEMALE AND MINORITY POPULATION ESTIMATES (1)

July, 1977

		Female		Black		Other Races		Spanish-American (2)	
Jurisdiction	Total Population	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total
S.F.-Oak. LMA	3,159,100	1,613,900	51.1	330,900	10.5	199,800	6.3	366,400	11.6
San Francisco	665,000	343,800	51.7	89,100	13.4	100,400	15.1	94,400	14.2
Alameda	1,094,300	558,100	51.0	164,100	15.0	56,900	5.2	137,900	12.6
Contra Costa	597,500	303,500	50.8	44,800	7.5	15,500	2.6	55,600	9.3
San Mateo	582,700	298,300	51.2	27,400	4.7	23,300	4.0	65,800	11.3
Marin	219,600	110,200	50.2	5,500	2.5	3,700	1.7	12,700	5.8

AFFIRMATIVE ACTION DATA
FEMALE AND MINORITY LABOR FORCE ESTIMATES (3)

July, 1977

		Female		Black		Other Races		Spanish-American (2)	
Jurisdiction	Total Labor Force	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total
S.F.-Oak. LMA	1,489,400	586,400	39.4	141,300	9.5	97,900	6.6	159,300	10.7
San Francisco	379,100	167,900	44.3	44,000	11.6	55,700	14.7	48,500	12.8
Alameda	497,800	193,600	38.9	68,700	13.8	24,400	4.9	56,700	11.4
Contra Costa	246,800	86,100	34.9	16,000	6.5	5,400	2.2	20,500	8.3
San Mateo	273,200	104,400	38.2	11,200	4.1	10,700	3.9	28,700	10.5
Marin	92,500	34,400	37.2	1,400	1.5	1,700	1.8	4,900	5.3

(1) Total population estimates from Population Estimates for California Counties, California Department of Finance, July, 1977 Female, Black, Other Nonwhite, and Spanish-American figures are estimates prepared by the Employment Data and Research Division, and are based on proportions from the 1970 census.

(2) The Spanish-American population is defined as persons of Spanish language or persons not of Spanish language but of Spanish surname.

(3) Estimates prepared by the Employment Data and Research Division. Female, Black, other races, and Spanish-American figures are estimates prepared by the Employment Data and Research Division, and are based on proportions from the 1970 census.

U.S. DEPARTMENT OF LABOR
MANPOWER ADMINISTRATION
RUN DATE - 76/08/05
LAWRENCE BERKELEY LABORATORY

EMPLOYED POPULATION 16 YEARS OLD AND OVER BY OCCUPATION, BY RACE AND ETHNIC GROUP
(COUNT)

SAN FRANCISCO-OAKLAND
SMSA IN CALIFORNIA

OCCUPATION	TOTAL	WHITE	BLACK	OTHER RACES	SPANISH AMERICAN	MINORITY GROUPS**
TOTAL ALL OCCUPATIONS - BOTH SEXES	1,267,643	1,070,252	113,430	83,961	133,969	331,360
Professional, Technical and Kindred Workers	230,086	205,171	11,356	13,519	13,411	38,326
Engineers, Technical	24,788	22,732	281	1,775	1,319	3,375
Physicians, Dentists and related practices	12,705	11,460	338	907	614	1,859
Medical and other Health Workers	23,243	19,515	2,002	1,726	1,525	5,253
Teachers, Elementary and Secondary Schools	37,472	33,845	2,290	1,337	1,953	5,580
Technicians, except Health	18,862	16,488	750	1,624	1,606	3,980
Other Professional Workers 1/	113,016	101,131	5,735	6,150	6,394	18,279
Managers and Administrators, except Farm	119,603	110,877	3,604	5,122	7,575	16,301
Salaried - Manufacturing	14,832	14,165	234	233	713	1,180
- Retailed Trade	18,403	17,160	464	779	1,369	2,612
- Other Industries 1/	66,229	61,843	2,230	2,156	4,058	8,444
Self-Employed - Retail Trade	8,840	7,350	280	1,210	731	2,221
- Other Industries	11,499	10,359	396	744	704	1,844
Sales Workers	103,599	95,906	3,756	3,937	7,528	15,221
Manufacturing and Wholesale Trade	23,171	22,255	402	514	1,578	2,494
Retail Trade	52,651	47,521	2,626	2,504	4,112	9,242
Other Sales Workers 1/	27,777	26,130	728	919	1,838	3,485
Clerical and Kindred Workers	292,149	245,112	25,115	21,521	29,198	76,234
Bookkeepers	30,287	26,934	993	2,360	2,470	5,823
Secretaries, Stenographers and Typists	82,111	72,864	4,195	5,052	7,712	16,959
Other Clerical Workers 1/	179,751	145,315	19,927	14,505	19,016	53,452
Craftsmen, Foremen and Kindred Workers	156,210	139,025	10,993	6,192	19,245	36,430
Automobile Mechanics and Body Repairmen	12,554	10,922	1,035	597	1,770	3,402
Mechanics and Repairmen, except Auto	25,750	22,857	1,578	1,315	3,229	6,122
Machinists	6,769	6,246	283	240	997	1,520
Metal Craftsmen, except Mechanics and Mach.	7,885	7,016	501	348	1,091	1,940
Carpenters	11,915	10,733	540	242	1,261	2,443
Construction Craftsmen, except Carpenters	25,425	22,559	2,151	715	3,353	6,219
Other Craftsmen	65,932	58,692	4,505	2,735	7,544	14,784

1/ Includes not Reported Cases allocated to this occupational group.
* Disclosure Suppression
** Sum of Black. Other Races. and Spanish American

GRADUATE DEGREES GRANTED IN ENGINEERING FIELDS
TO WOMEN AND MINORITIES
UNIVERSITY OF CALIFORNIA, BERKELEY
1976 - 1977

	WOMEN	MINORITIES* (Men/Women)
CIVIL ENGINEERING		
BS	4	35
Masters	7	34
Doctoral	1	3
ELECTRICAL & COMPUTER SCIENCE		
BS	12	72
Masters	7	30
Doctoral	3	11
MECHANICAL ENGINEERING		
BS	6	16
Masters	2	14
Doctoral	1	4

*NOTE: For this table, U.C. Berkeley used the following ethnic groupings in their definition of minority: Black, Hispanic, Asian, and American Indian

GOALS AND TIMETABLES CHART *

PARSONS BRINCKERHOFF - WESTERN REGION
May, 1979 - May, 1980

(Includes Santa Ana, Seattle & Sacramento Office Personnel)

OCCUPATIONAL CATEGORIES	TOTAL EMPLOYED	Minority & Women Employed As of May, 1979				Expected TOTAL Employees Next 12 Months	Goals for TOTAL (Net Additional) Minorities and Women by May, 1980			
		BLACK	SSA	ASIAN	WOMEN		BLACK	SSA	ASIAN	WOMEN
Officers/ Managers	12			1	1	12				
Professional	46	2		6	5	49	2	1	2	2
Technicians	5		1	2	1	8	1			1
Office Support Clerical	10	2		2	9	11	1	1		2
TOTAL	73	4	1	11	16	80	4	2	2	5

* The goals for the employment of minorities and women are realistic and can be reasonably expected to result from our good faith efforts. However, they are not rigid, inflexible quotas and must be responsive to factors such as expansion, contraction and turnover in the work force.

The goals for May, 1978 - May, 1979 were successfully met.

Form A
Employment Practices

Please read the attached January 31, 1979, Memorandum to Prospective Consultants carefully, before completing this form.

Please complete the form for the branch office that will perform the project work only.

If the form is not correctly and fully completed, the City will not be able to consider your proposal.

Please return directly to:

The Office of the Human Rights Commission
1095 Market Street, Suite #501
San Francisco, Calif. 94103

Name of consultant: PBQ&D, INC.

Name of project: Design of the J Line Extension for San Francisco Municipal Railway

4244

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